Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

M E M O R A N D U M

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 29, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho was 0.1 feet below schedule while Toho was 0.4 feet above schedule. Kissimmee-Cypress-Hatchineha was 0.1 feet below schedule. Over the past week, discharges at S65, S65A, and S65E averaged 1,670, 1,460 and 1,720 cfs, respectively. Tuesday morning discharges for S65, S65A, S65C, and S65E were: ~4,975, ~4,925, ~1,905, and~1,765 cfs, respectively. Dissolved oxygen in the Kissimmee River averaged 5.76 mg/L over the past week. Kissimmee River mean floodplain depth is currently at 0.70 feet. There are no new recommendations for this week.

Lake Okeechobee

The recession in Lake stage slowed this past week. The Lake dropped only 0.13 feet and elevation change has been static for the past five days. The Lake is at 15.07 feet NGVD and is in the Low Flow Sub-band. Ecological conditions for wading birds, snail kites, and species in the nearshore region remain poor but may improve if the recession continues.

Estuaries

For the St. Lucie, total inflow averaged 1,711 cfs, which is slightly more than last week but with only 53% coming from Lake Okeechobee. Salinity was in the fair range for oysters at the Roosevelt Bridge. Total inflows to the Caloosahatchee averaged 3,193 cfs, a decline from last week with 71% coming from Lake Okeechobee. Salinity conditions in the upper estuary were favorable for tape grass. Salinity was in the poor range for oysters at the Cape Coral Bridge but in the good range at Shell Point and the Sanibel Causeway. It is recommended that any decrease in water release rates occur incrementally to avoid any abrupt changes in environmental conditions that may negatively affect ecosystem health.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 6,900 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (since May 1) is approximately 209,000 acre-feet. All STA cells are at or above target depths and restrictions are in place for structure repairs, vegetation rehabilitation and Snail Kite nesting in STA-1E, vegetation rehabilitation in STA-1W, Snail Kite nesting in STA-2, and vegetation rehabilitation in STA-3/4. This week, if LORS2008 recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E and A-1 FEB. A-1 FEB releases will be sent to STA-2.

Everglades

Water levels have continued to decline in most areas as expected for this time of year and are currently about one to four feet deep in most of the wetlands. Southern WCA-3A water levels have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 18 weeks. Deep water is affecting terrestrial wildlife, preventing wading bird foraging and nesting, and may be affecting vegetation on tree islands. The 30-day moving average salinity at the Florida Bay MFL site is 1.0 psu and the cumulative inflow from the five creeks into Florida Bay has risen to 263,750 acre-feet. Florida Bay salinities are slightly below average for this time of year.

Weather Conditions and Forecast

Heavy thunderstorms this afternoon and tonight. A cold front has pushed into the area and it is stalling across the mid-section of the District. An energy impulse moving across the Gulf of Mexico has produced a large area of showers and thunderstorms just west of the Florida peninsula. Expect this energy to move across the area this evening and interact with the frontal boundary to produce areas of heavy thunderstorm activity beginning later this afternoon and continuing this evening and into the night. Breezy southeasterly winds will build back over the area as the frontal boundary retreats northward on Wednesday. Expect daytime heating to generate scattered afternoon thunderstorm activity west on Wednesday and then mainly over the interior and north on Thursday. The next frontal boundary is forecast to move into the District Saturday so expect daytime heating to generate mainly afternoon showers and thunderstorms focused north and east Friday and Saturday. Daily thunderstorm activity is expected to taper off by next Tuesday.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 3.44 inches of rainfall in the past week and the Lower Basin received 1.27 inches (SFWMD Daily Rainfall Report 3/28/2016).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 3/29/2016

Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	Sunday Departure (feet)						
							3/27/16	3/20/16	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16
Lakes Hart and Mary Jane	S62	153	LKMJ	60.5	R	60.8	-0.3	-0.4	-0.4	-0.4	-0.6	-0.6	-0.4
Lakes Myrtle, Preston, and Joel	S57	49	S57	61.1	R	60.7	0.4	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Alligator Chain	S60	170	ALLI	64.1	R	63.7	0.4	-0.2	-0.3	-0.3	-0.3	-0.2	-0.5
Lake Gentry	S63	311	LKGT	61.5	R	61.2	0.3	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3
East Lake Toho	S59	495	TOHOE	57.5	R	57.6	-0.1	-0.5	-0.7	-0.4	-0.6	-0.5	-0.6
Lake Toho	S61	1190	TOHOW	55.0	R	54.6	0.4	-0.4	-0.6	-0.5	-0.6	-0.5	-0.6
Lakes Kissimmee, Cypress, and Hatchineha	S65	1668	LKISSP, KUB011, LKIS5B	50.9	R	51.0	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	-0.2

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 11. Kissimmee River floodplain stages at selected stations are shown in Figure 12.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: **3/29/2016**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			3/27/16	3/20/16	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16	2/7/16	1/31/16	1/24/16
Discharge (cfs)	S-65	4313	1668	402	505	1313	2770	2257	1997	3248	802	477
Discharge (cfs)	S-65A	4093	1461	280	408	1214	2817	2261	2223	3772	1355	1115
Discharge (cfs)	S-65C	1485	746	492	1237	2629	2850	2515	3805	2987	2261	2017
Headwater stage (feet NGVD)		34.0	34.0	34.1	34.2	34.9	35.2	34.5	34.8	34.5	33.7	33.7
Discharge (cfs)	S-65D****	1461	753	534	1375	2713	3112	2810	4355	3811	3336	2716
Discharge (cfs)	S-65E	1469	717	487	1360	2696	3101	2880	4513	3975	3703	2779
DO concentration (mg/L)***	Phase I river channel	5.76	5.74	5.98	5.98	5.36	5.37	6.82	7.39	5.85	7.36	6.56
Mean depth (feet)*	Phase I floodplain	0.70	N/A	0.48	0.52	1.12	1.81	1.44	1.64	2.19	1.10	0.92

* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

** Seven-day average of weighted daily means through Sunday midnight.

*** DO is the average for PC62 and PC33 starting June 2.PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

***** 1-day spatial average from field measurements in Pools A and BC

N/A Not applicable or data not available.

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
3/29/2016	No new recommendations.			
3/22/2016	No new recommendations.			
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team
1/20/2016	Continue to adjust discharge at S65 to follow the 2015-16 Dry Season SR guidelines for rampdown at S65A. Balance discharge at the two structures to maintain at least minimum discharge to the river. As stage rises above 51 ft in KCH, temporarily bypass the Fig 1 discharge plan in the SR and manage discharge to let KCH stage rise to 51.5 ft (the Feb 1 recession starting stage) if conditions allow while following rampdown guidelines. If KCH stage rises further than 51.5 ft, we will reevaluate. As changes in discharge become necessary, continue to follow the Table 1 guidelines in the SR. Switch to Table 2 rampup/rampdown guidelines on Feb 1 or when the recession line is intercepted for management of the recession in KCH.	If conditions allow, let stage increase to 51.5 ft to intersect the Feb 1 starting stage for KCH F&W recession line.	Implemented	KB Tech Team
12/10/2015	Temporarily raise from 50.5 ft to 51 ft the threshold stage for increasing discharge at S65/S65A to 1400 cfs. This is a temporary modification of the current draft 2015-16 dry season Standing Recommendation (SR). Discontinue last week's temporary change in the rate of discharge increase and return to the original per-day rates shown in Table 1 of the draft SR - i.e., increase discharge to 1400 cfs at a rate of 150 cfs/day rather than 150 cfs/2 days. If KCH stage should start to decline while ramping up but before reaching 1400 cfs, begin to ramp back down using the rates in Table 1.	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team

KCOL Hydrographs (through Sunday midnight)

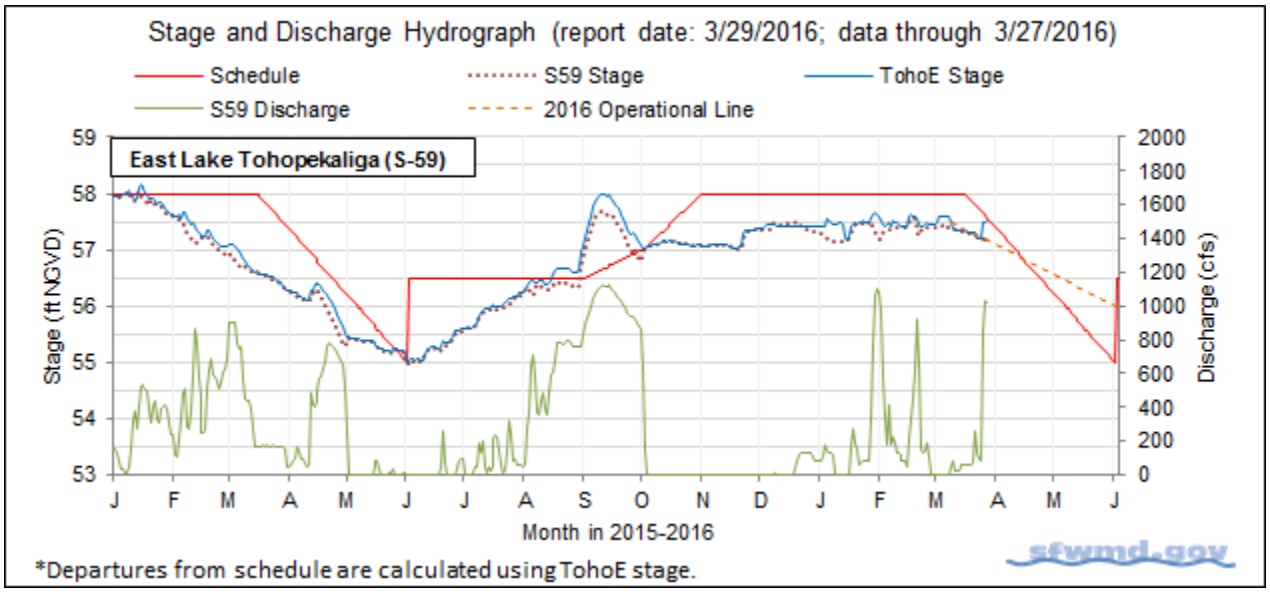


Figure 1.

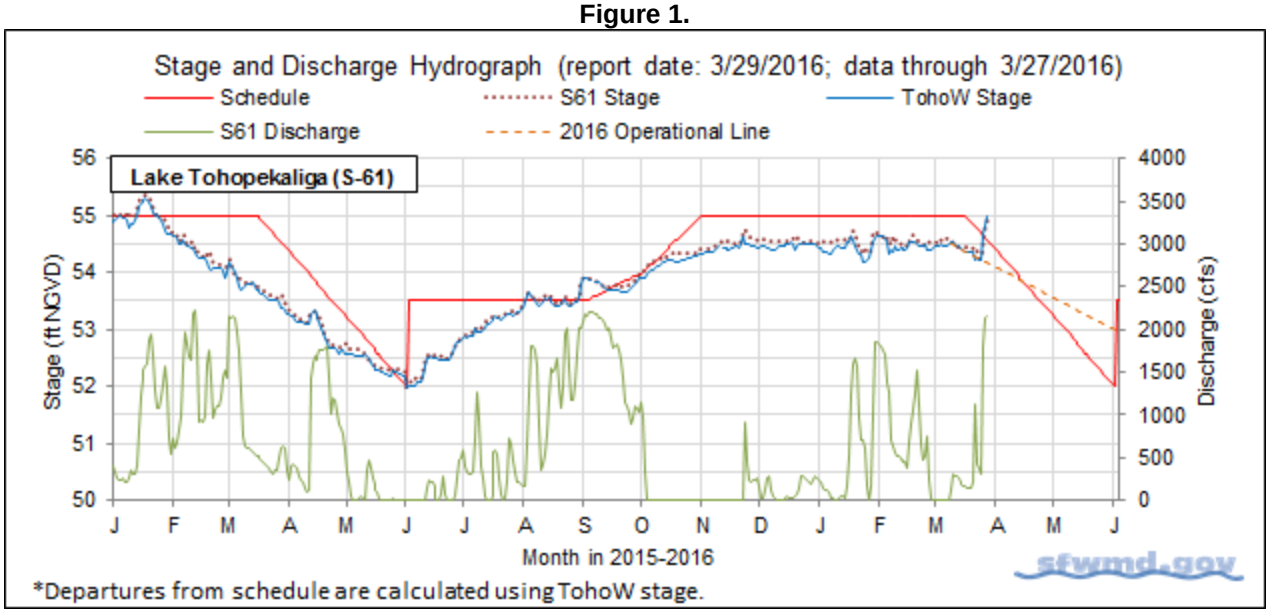


Figure 2.

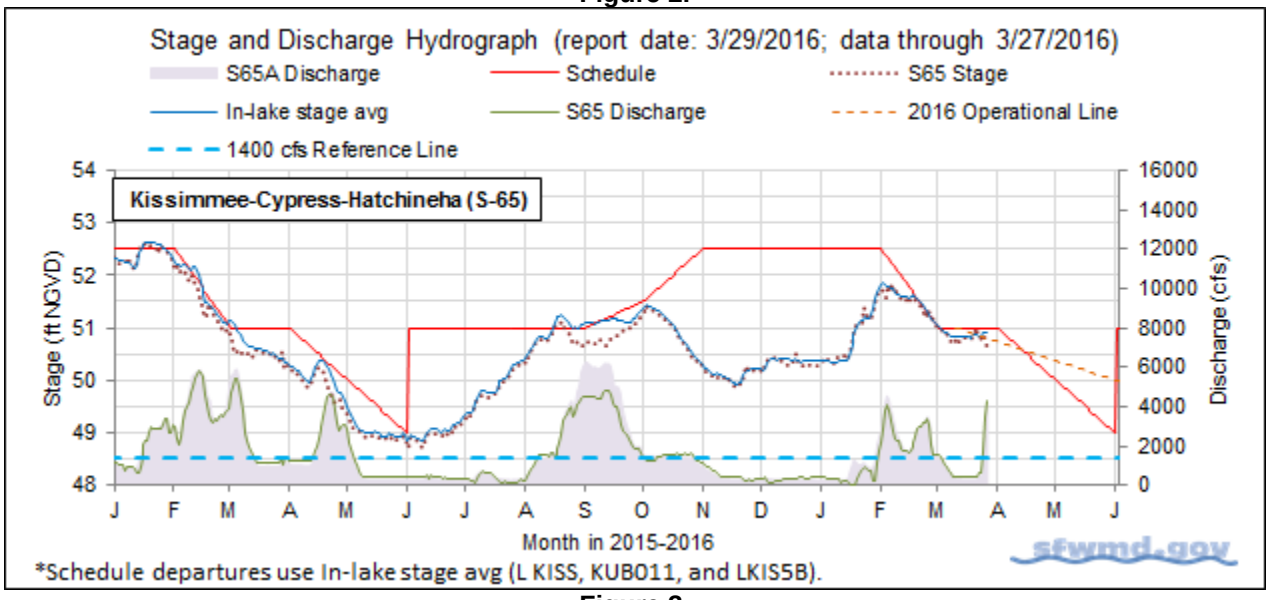


Figure 3.

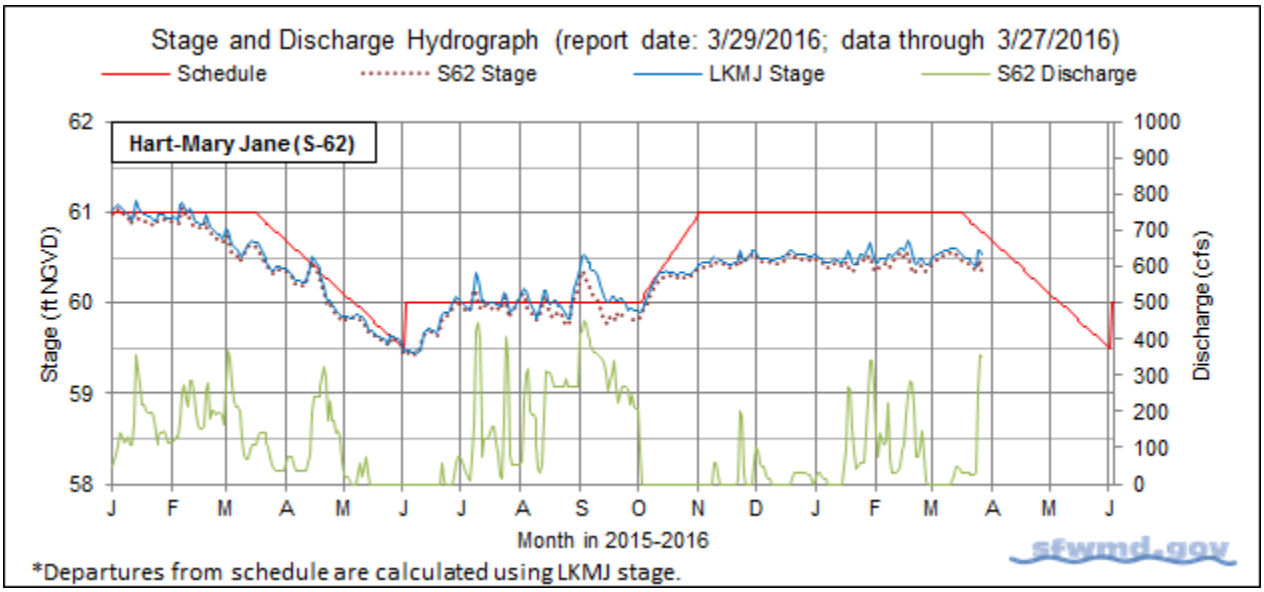


Figure 4.

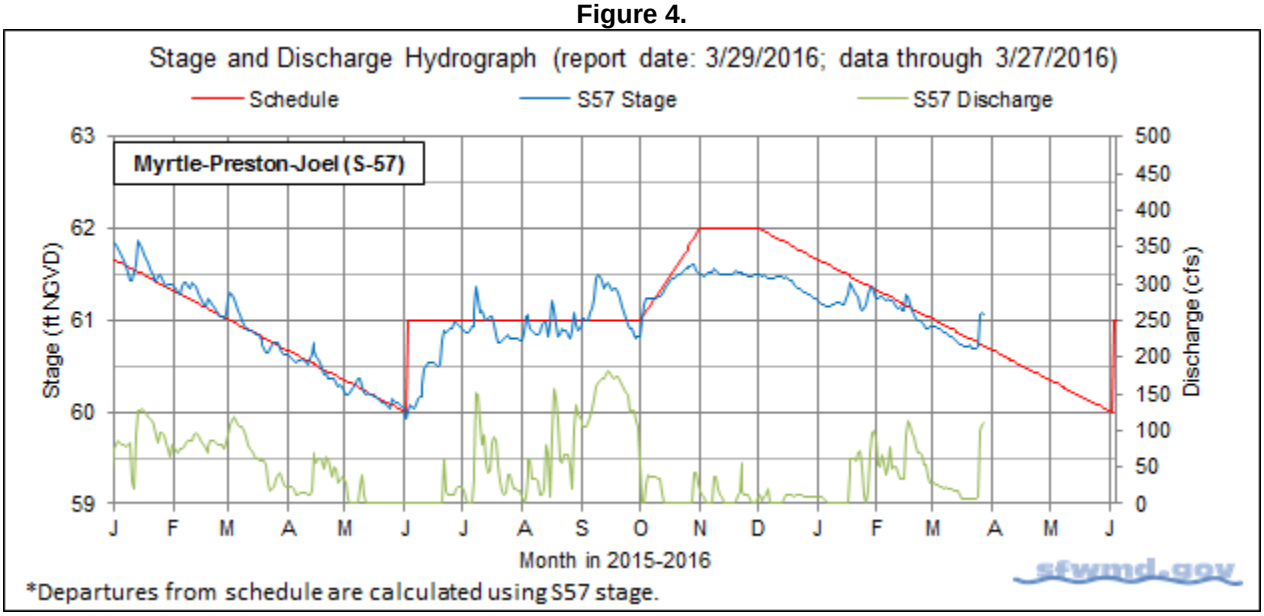


Figure 5.

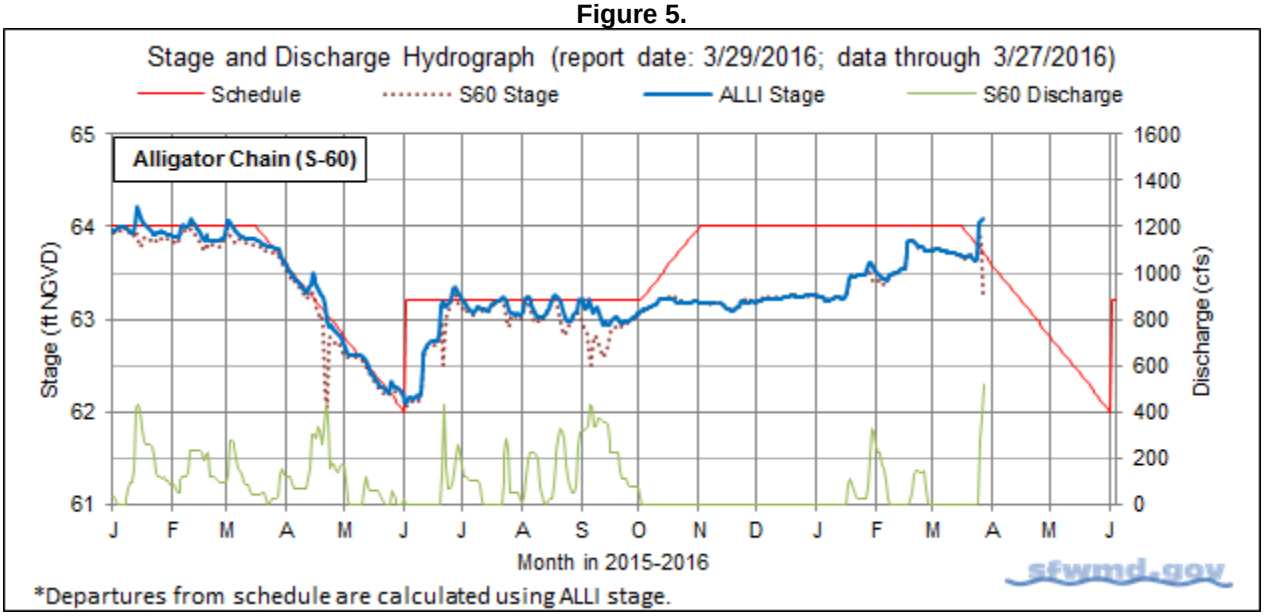


Figure 6.

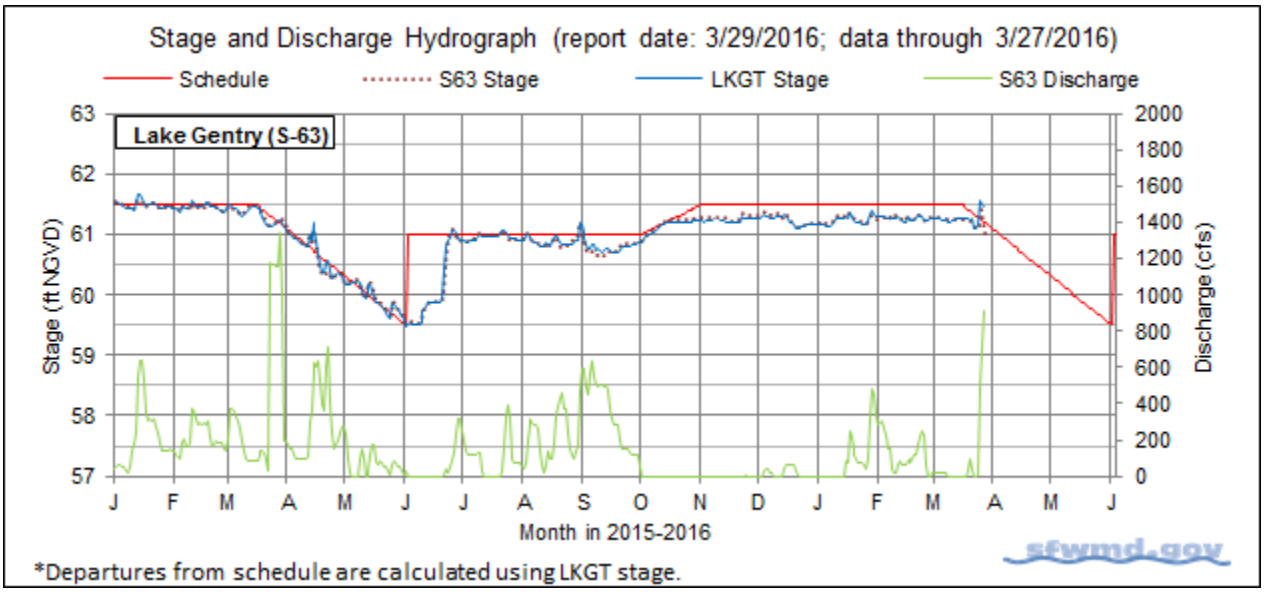
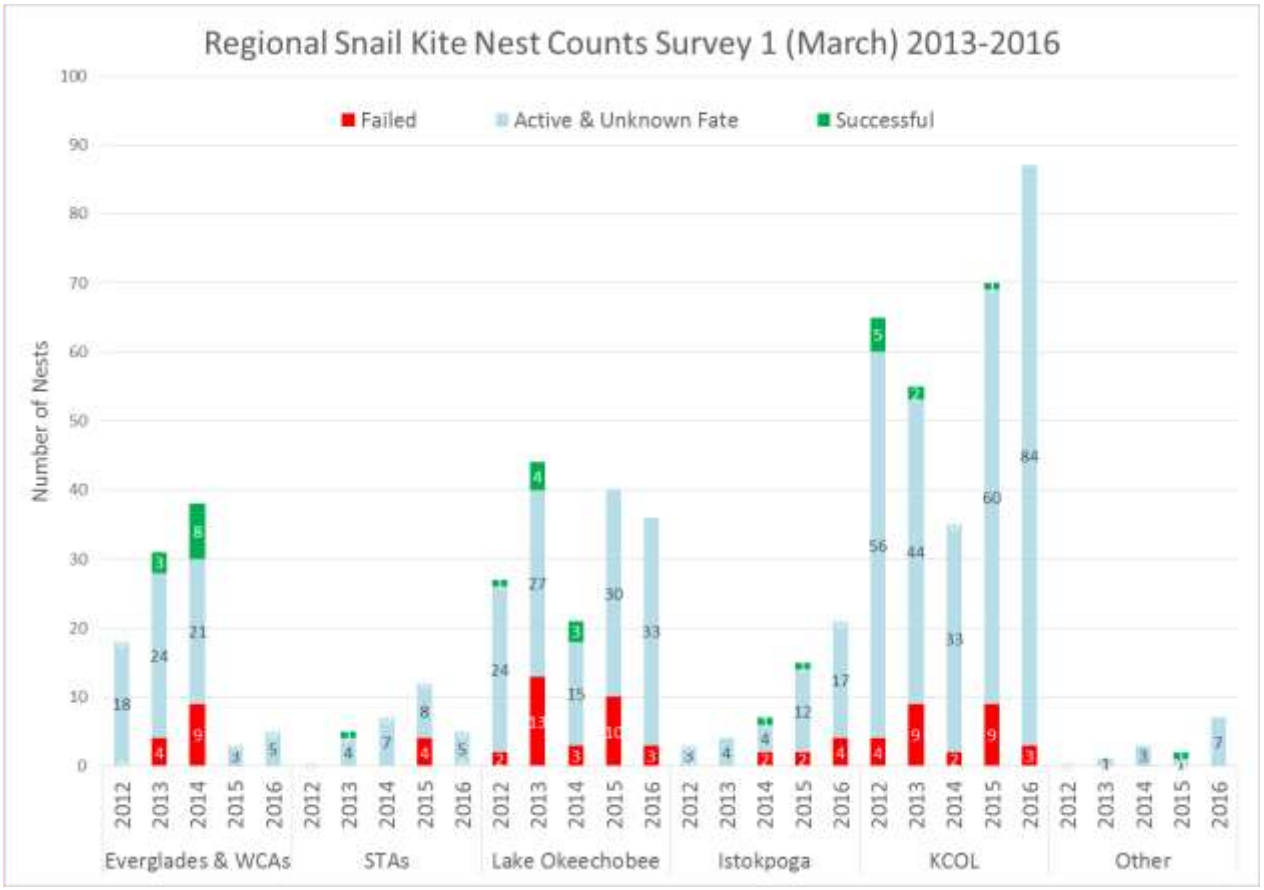
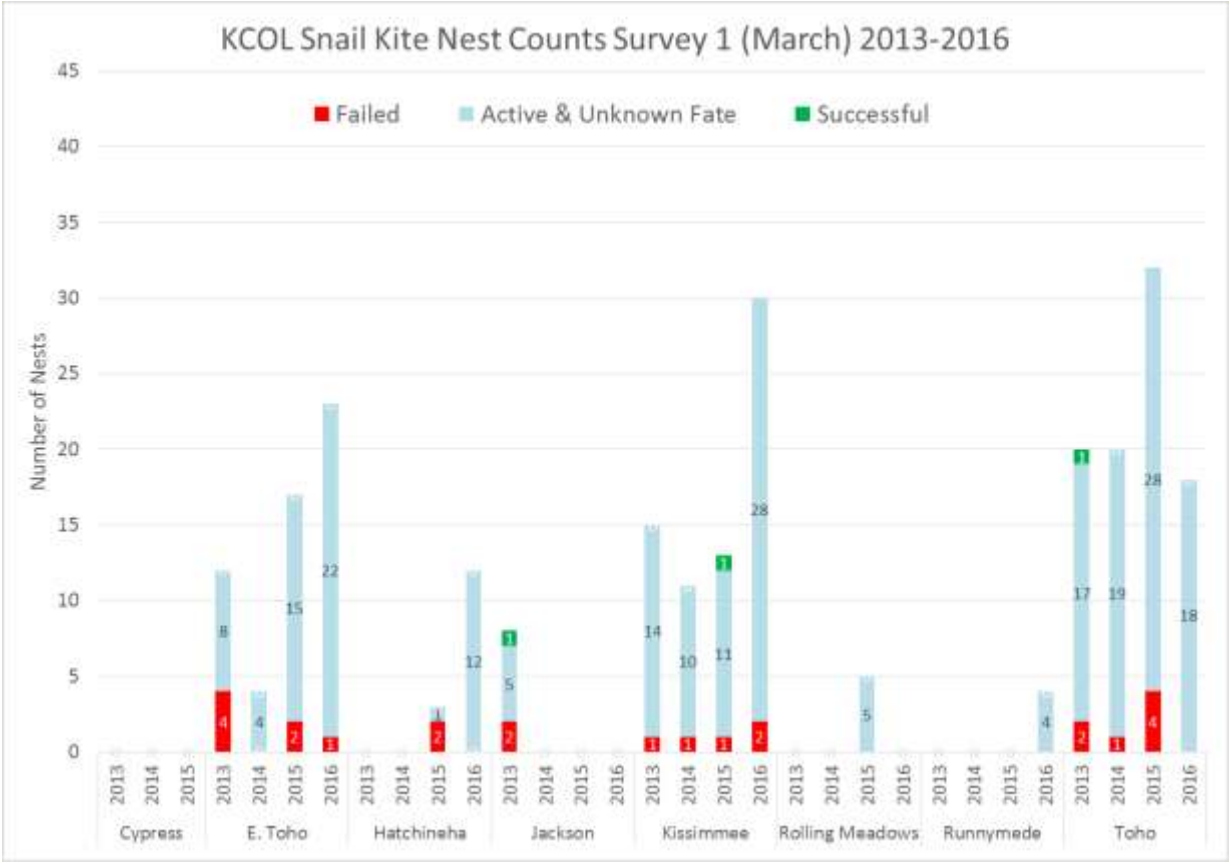


Figure 7.



Insert A. Regional Snail Kite nest counts for Survey 1 (March) in 2013-2016.



Insert B. Snail Kite nest counts in the KCOL for Survey 1 (March) in 2013-2016.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Limits on Rate of Discharge Change at S65/S65A During F&W Recessions for Dry Season 2015-2016

Table 2. Maximum discharge rate of change limits for S65/S65A for use during departures after stage has intersected the KCH F&W recession line. These are maximum rates and should be implemented with discretion and as slowly as possible.
****Rate limits apply only in Zone B****

		Departure (ft) above the F&W line				Departure (ft) below the F&W line				
		<= 0.5	> 0.5	> 0.75	> 1.0	>= -0.3	< -0.3	< -0.5	< -0.75	< -1.0
	Q (cfs)	Maximum rate of increase (cfs/day)				Maximum rate of decrease (cfs/day)				
Zone B	0-300	50	100	150	200	-50	-100	-150	-200	-250
	300-1400	150	300	450	600	-75	-150	-225	-300	-375
	1400-2500	300	600	800	800	-300	-600	-600	-600	-600
	2500-3000	1000	1000	1000	1000	-600	-600	-600	-600	-600
Zone A		No limits								

*S65 discharge plan for Wet Season 2015 was discontinued on January 20, 2016 to allow lake stage to rise by Feb 1 as conditions permit. From 2015-2016 dry season standing recommendation.

Figure 8a. Limits on rate of discharge change at S65/S65A during F&W recession for dry season 2015-2016. Table 2 is from the 2015-2016 Dry Season Standing Recommendation.

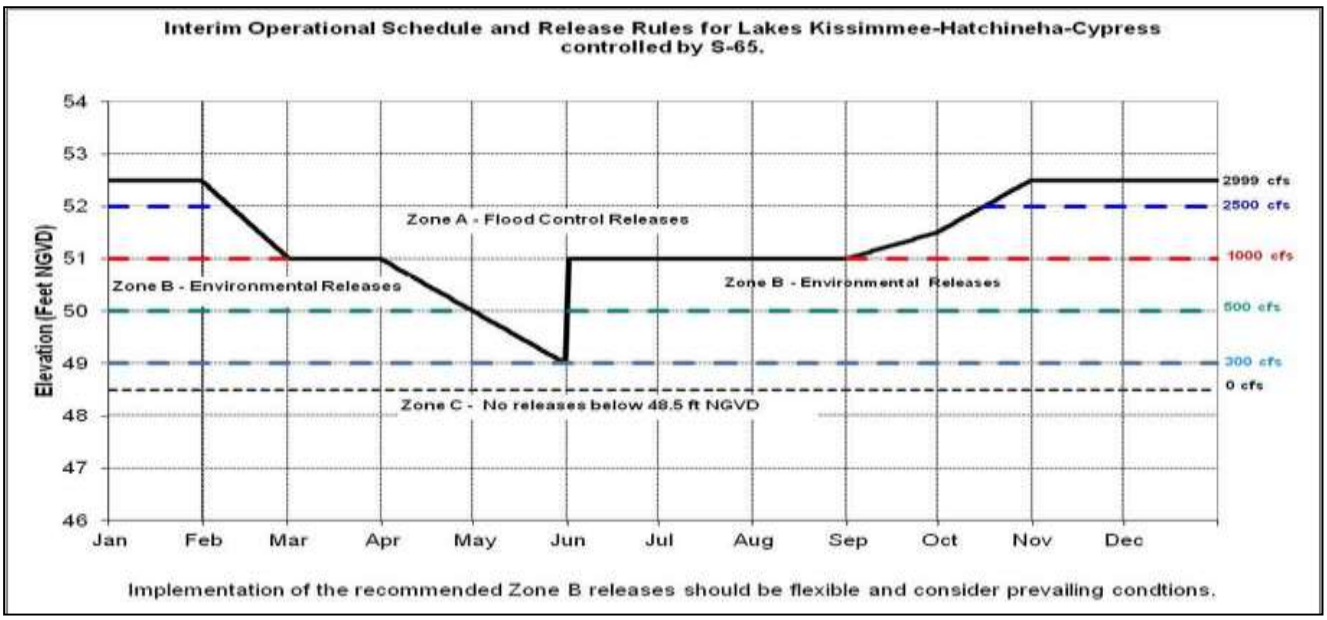


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

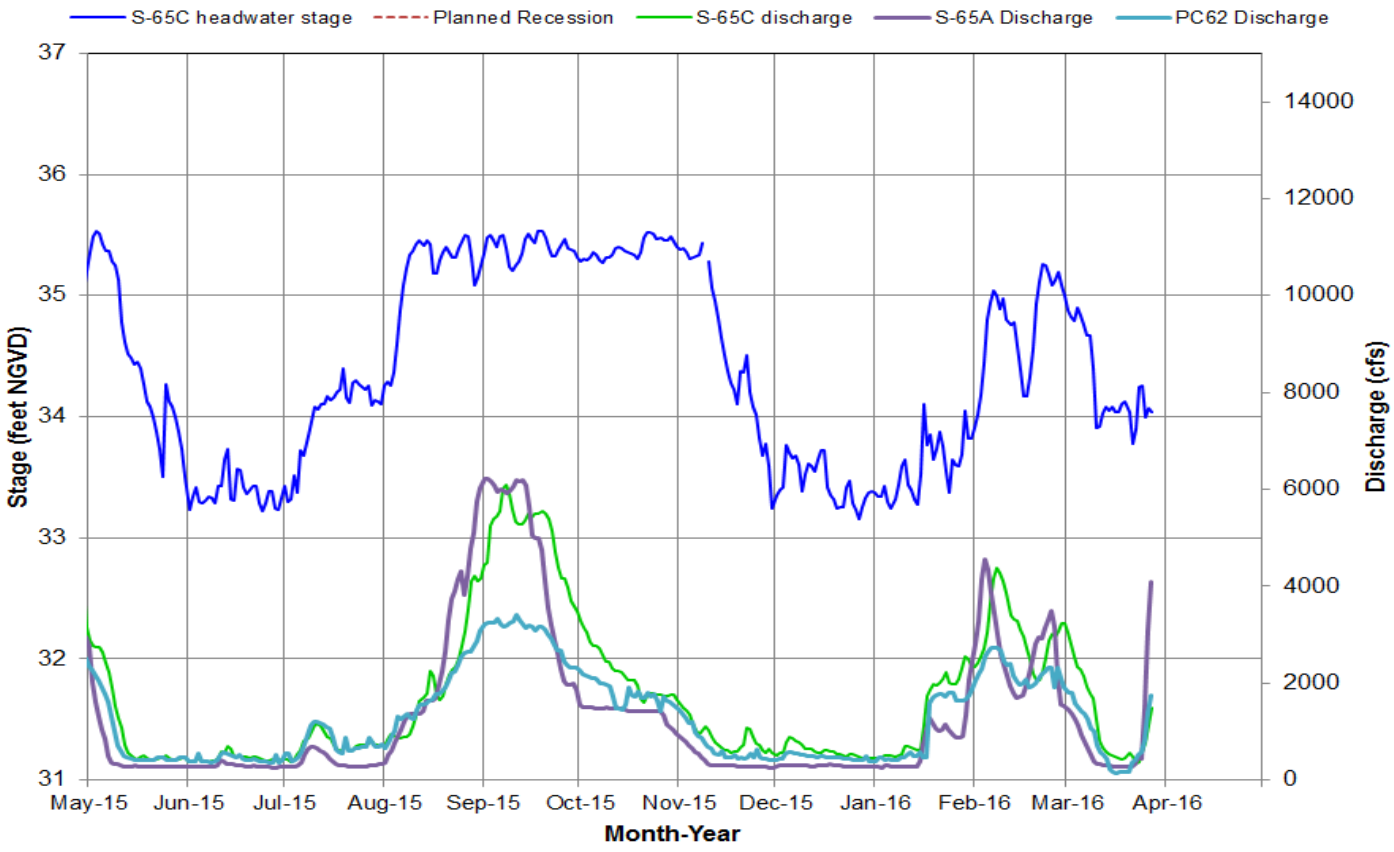


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

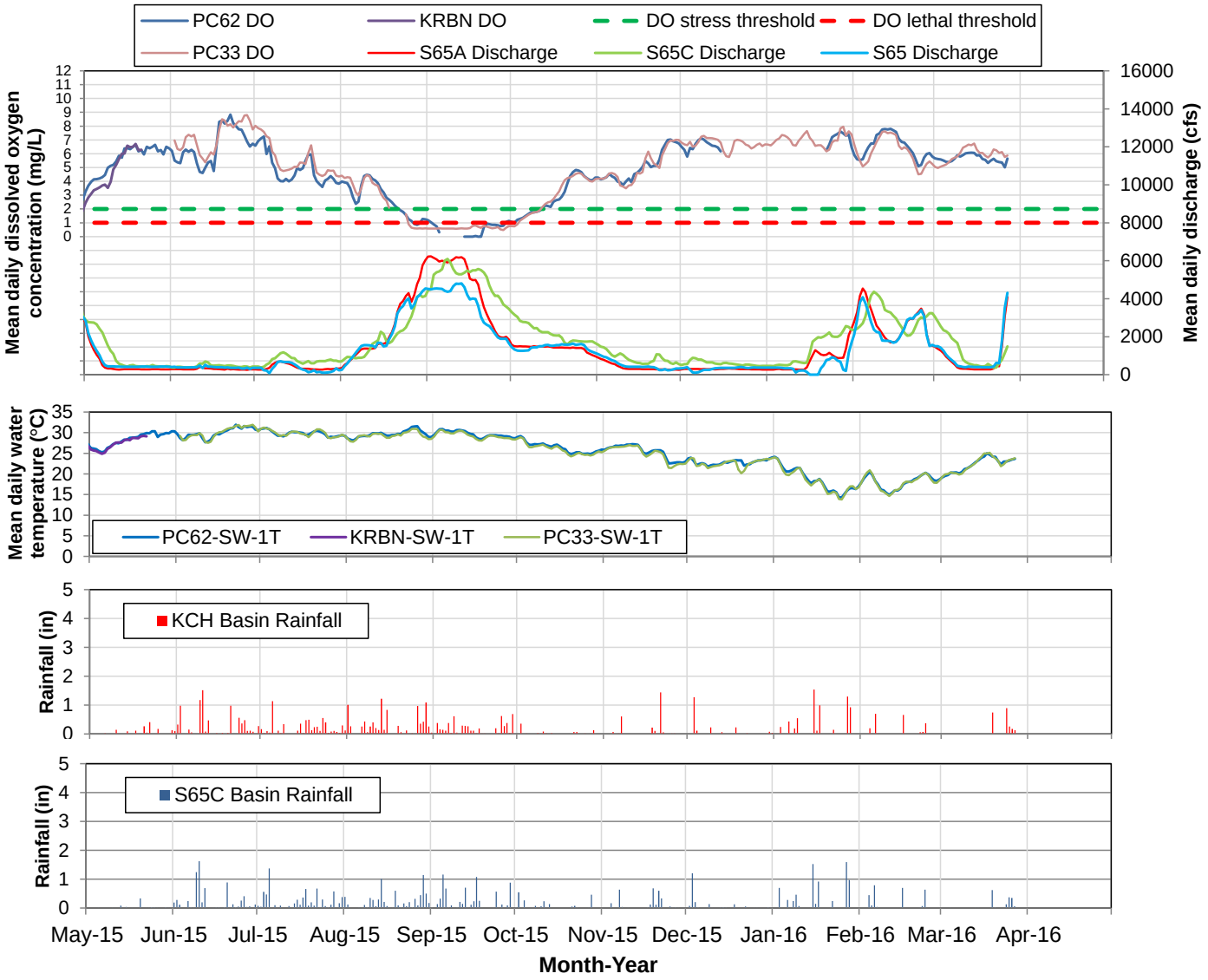


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

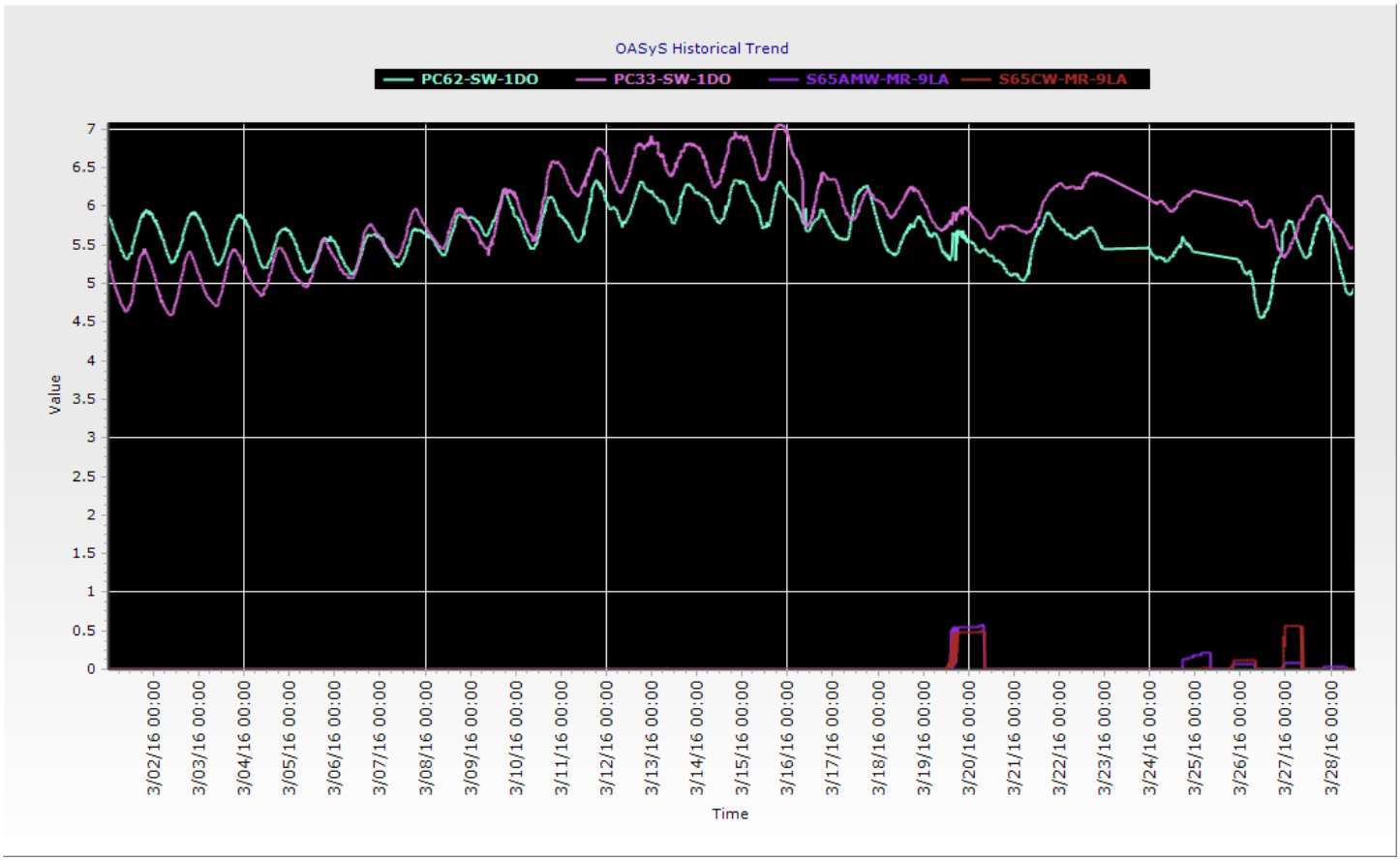


Figure 11. Phase I river channel Dissolved Oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

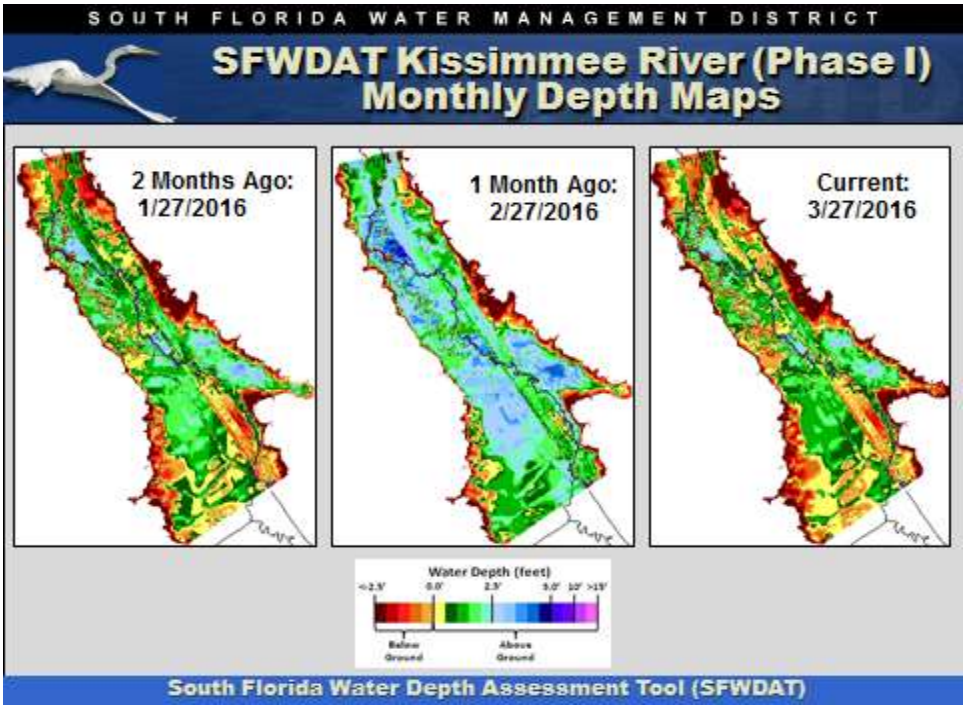


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs

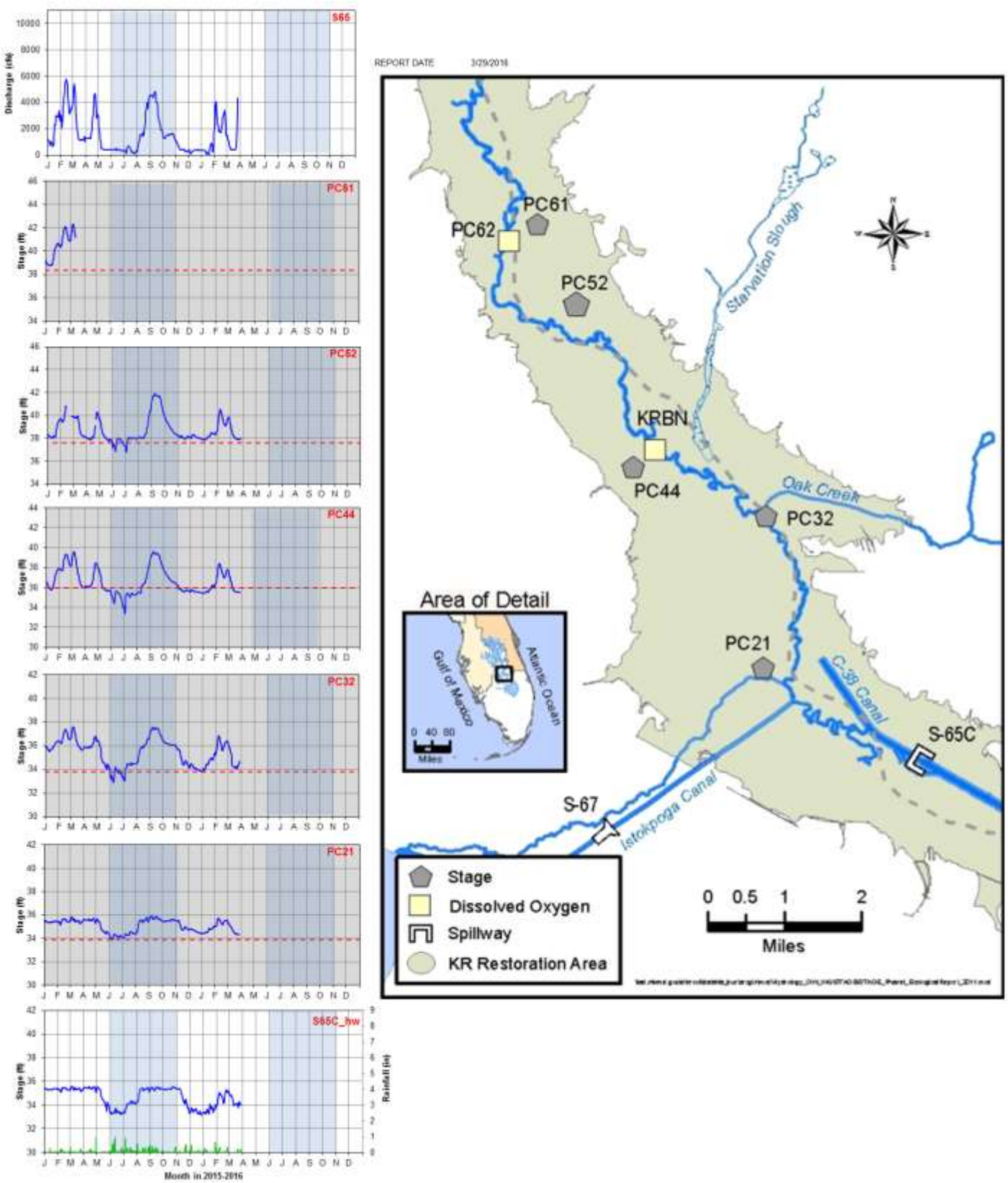


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

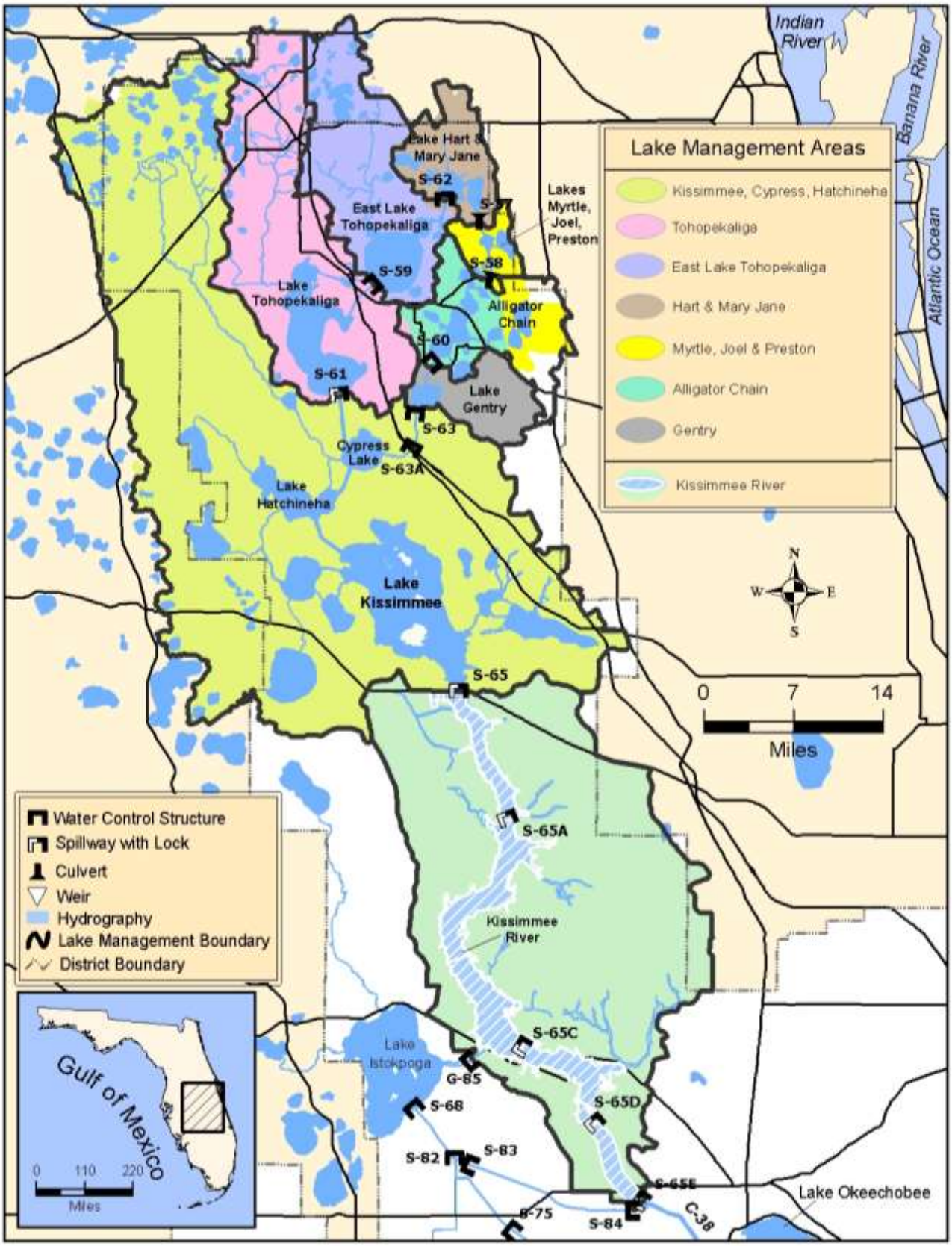


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.07 feet NGVD for the period ending at midnight on March 28, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.13 feet over the past week. The Lake is 0.89 feet lower than it was a month ago and 0.94 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINDAR, 0.66 inches of rain fell directly over the Lake during the past seven days. Similar or greater amounts of rain fell in the western, northern and most of the eastern watershed while similar or less rain fell in the southern and a small portion of the eastern watershed (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 3,921 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	1787
S154	53
S84 & 84X	467
S71	958
S72	357
C5(Nicodemus slough dispersed storage)	-154
S191	0
S133 PUMPS	97
S127 PUMPS	48
S129 PUMPS	54
S131 PUMPS	38
S135 PUMPS	174
Fisheating Creek	42
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 4,226 cfs exiting at S77 (2,040 cfs), S308 (1,174 cfs), S354 (409 cfs), S351 (239 cfs), S352 (189 cfs) and to the L8 canal through Culvert C10A (175 cfs). Water supply demands remain high in the EAA resulting in continued higher flows through S351, 352, and 354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,700 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 50,815 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 13,562 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5).

The March monthly water quality indicates that lakewide total phosphorus and total suspended solid values were similar on a lakewide basis, similar or lower in the nearshore region and higher in the pelagic region relative to the February values (Figure 6). Moderate chlorophyll *a* concentrations were recorded at three nearshore sites and microcystin concentrations were at or above the detection limit

at five nearshore and one pelagic site (Figure 7). The most recent MODIS satellite images (March 22 and 26) indicate the absence of potential algal bloom conditions on the Lake. Colored pixels noted on the March 26 image reflect edge effects associated with cloud cover (Figure 8).

Water Management Recommendations

The winter/spring dry season recession has continued now for seven weeks with a decrease of 0.13 feet this past week although Lake stage has been static for the last 5 days reflecting increasing inflows and decreasing outflows. Future short-term recommendations will depend in large measure on the near-term rainfall patterns and amounts. Actions which contribute to continuing the recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation) and faunal (wading birds, snail kites and fish) communities.

The operational goal continues to be to maintain a small but steady decrease in water levels not to exceed 1.1 feet per month (0.29 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and to avoid additional reversals in Lake stage.

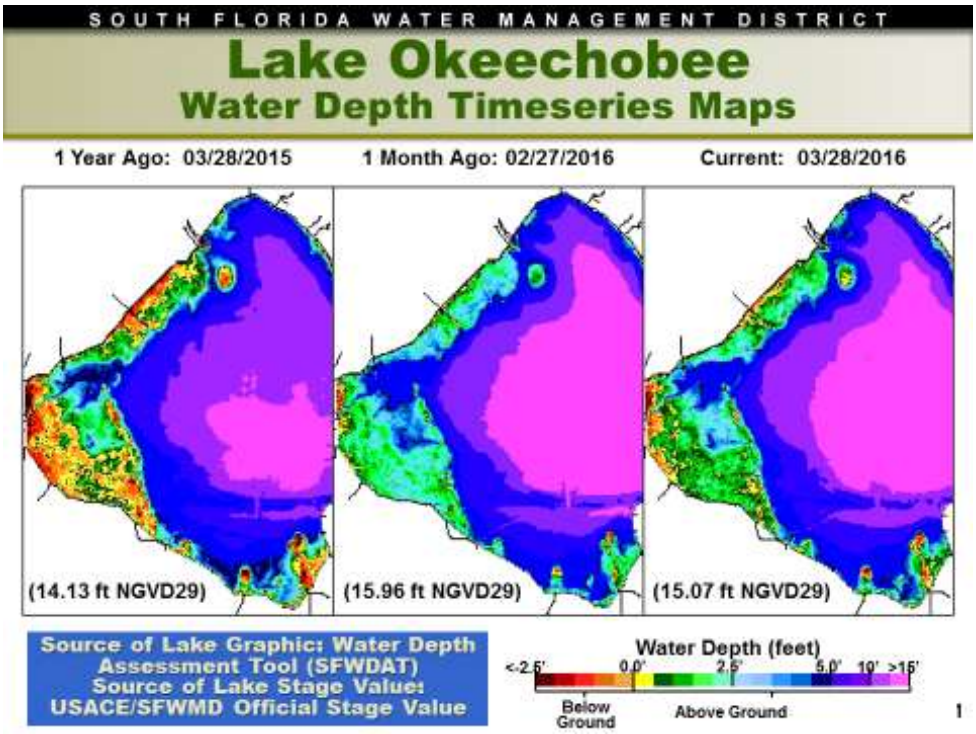


Figure 1

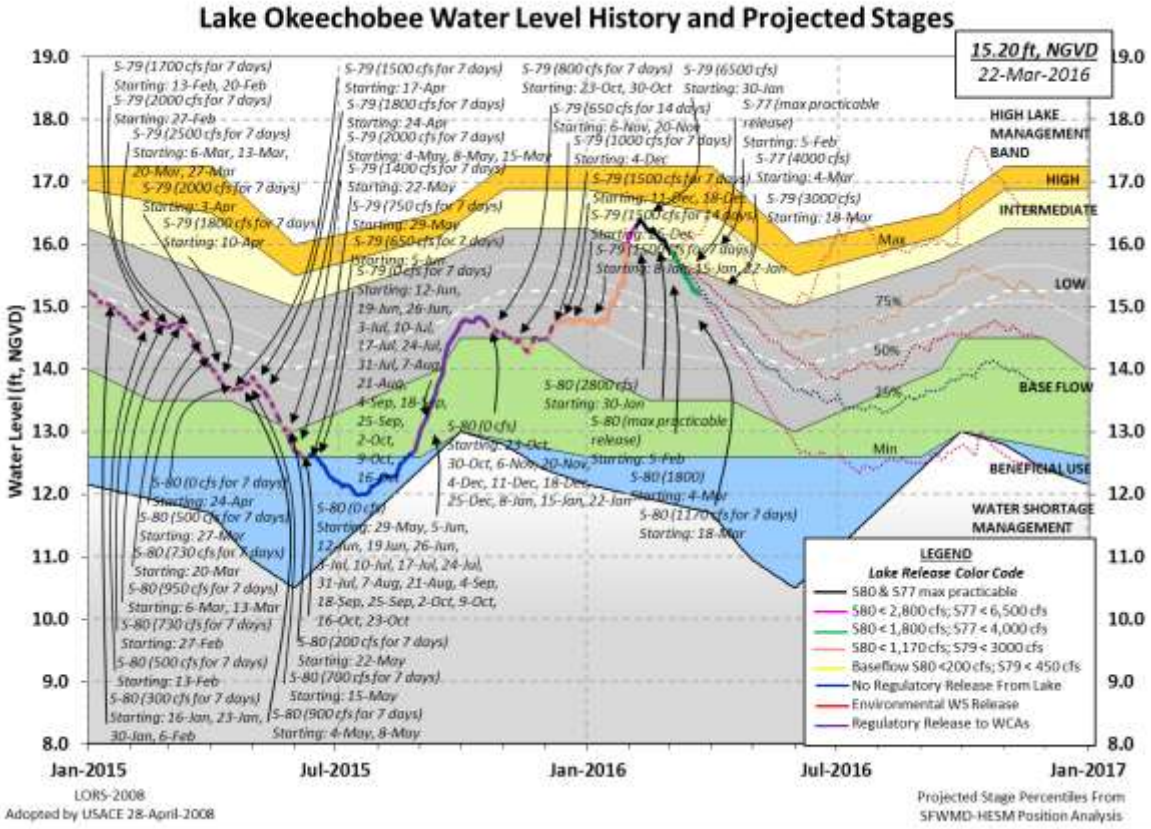

Lake Okeechobee Water Level History and Projected Stages
15.20 ft, NGVD
22-Mar-2016
Water Level (ft, NGVD)
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
LEGEND
Lake Release Color Code
S80 & S77 max practicable
S80 < 2,800 cfs; S77 < 6,500 cfs
S80 < 1,800 cfs; S77 < 4,000 cfs
S80 < 1,170 cfs; S79 < 3000 cfs
Baseflow S80 <200 cfs; S79 < 450 cfs
No Regulatory Release From Lake
Environmental WS Release
Regulatory Release to WCAs
Jan-2015
Jul-2015
Jan-2016
Jul-2016
Jan-2017
LORS-2008
Adopted by USACE 28-April-2008
Projected Stage Percentiles From
SFWMD-HESM Position Analysis

Figure 2

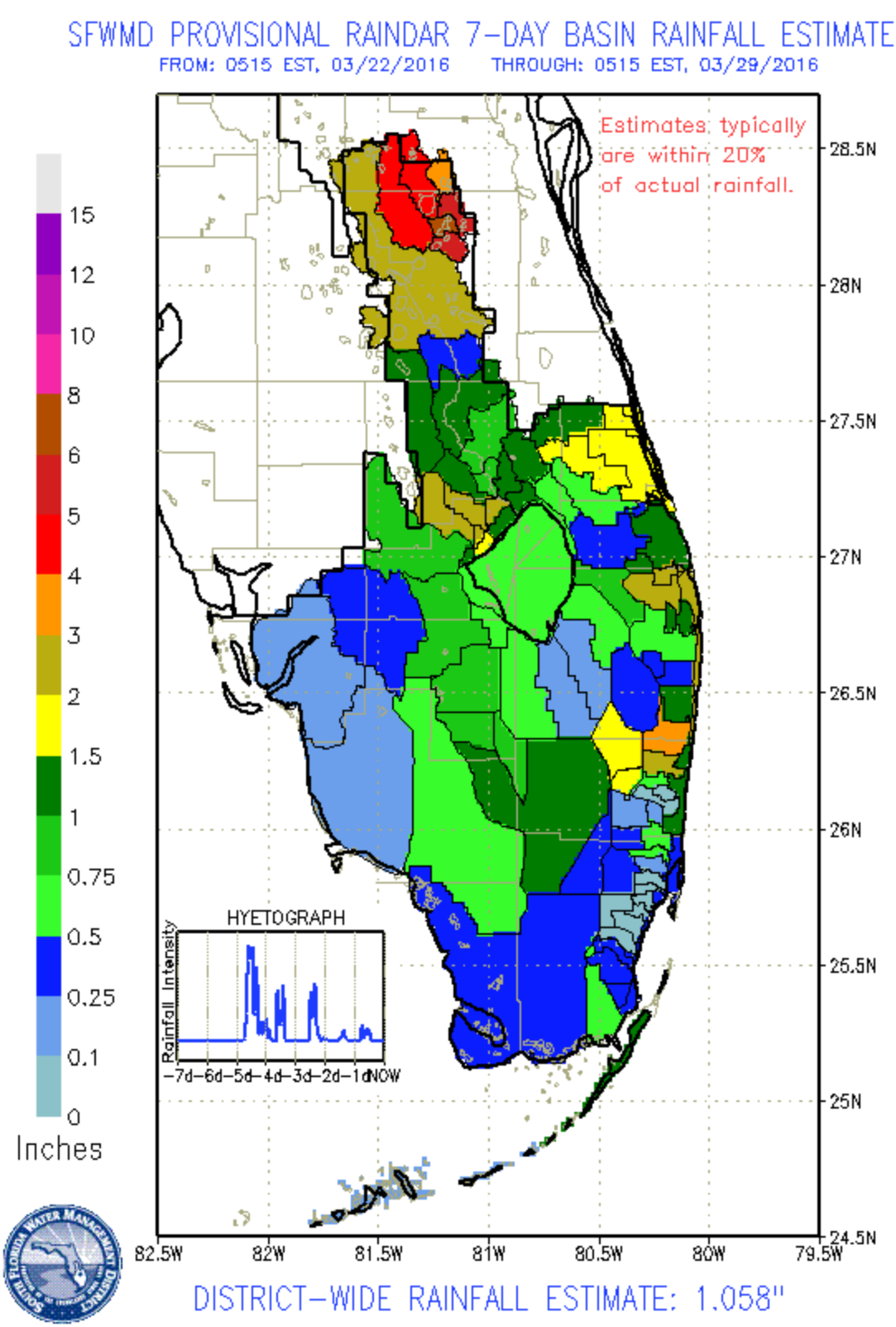

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0515 EST, 03/22/2016 THROUGH: 0515 EST, 03/29/2016
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1dNOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 1.058"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	870	0.029
S71 & 72	973	0.032
S84 & 84X	210	0.007
Fisheating Creek	136	0.004
Rainfall	N.A.	0.055
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	2273	0.075
S308	912	0.030
S351	271	0.009
S352	103	0.003
S354	426	0.014
L8	200	0.007
ET	1700	0.056

Figure 4

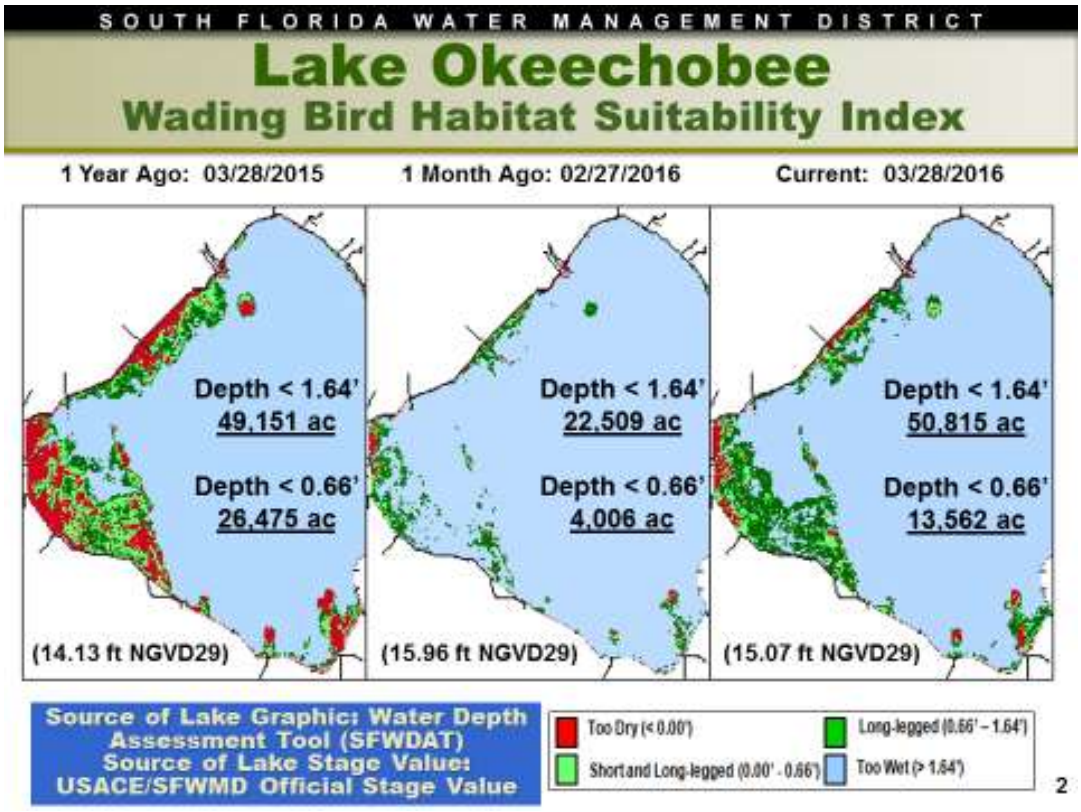
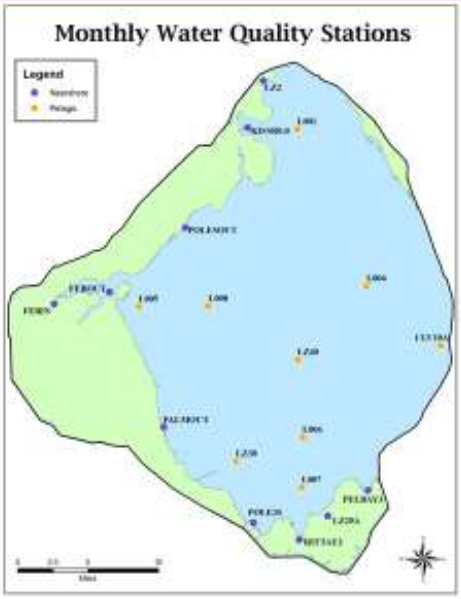


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Water Quality



Parameter		Jan 2016	Feb 2016	Mar 2016
TP ppb	Nearshore	114	97	84
	Pelagic	188	116	128
	Lakewide	149	106	104
TSS ppm	Nearshore	22	6	7
	Pelagic	65	15	21
	Lakewide	42	10	14

Figure 6

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Algal Blooms

BDL = Below Detection Limit

Mar 1-7, 2016

Site	Microcystin ug/L	Chlorophyll a ug/L
LZ2	0.26	13.6
KISSR0.0	0.20	11.0
PALMOUT		24.7
PELBAY3		4.2
POLE3S		10.8
POLESOUT	0.41	27.7
RITTAE2		15.5
LZ25A		4.5
FEBIN		0.2
FEBOUT		9.7
L001		7.8
L004		5.6
L005	0.20	24.9
L006		2.9
L007		3.1
L008		7.3
LZ30	0.20	6.1
LZ40		6.4
CLV10A	0.20	3.7

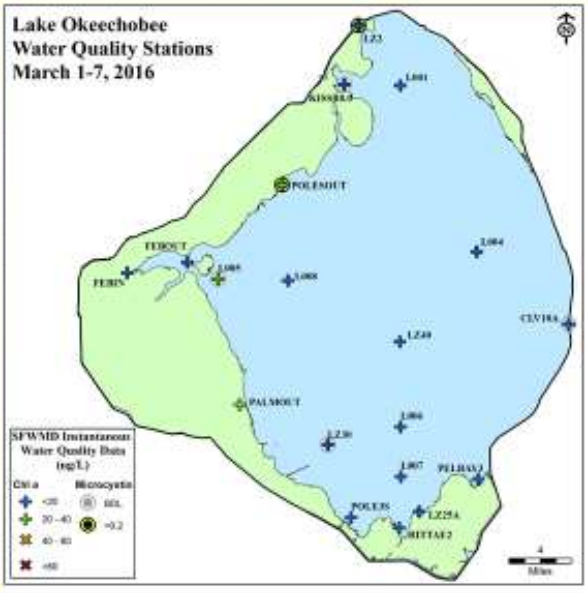


Figure 7

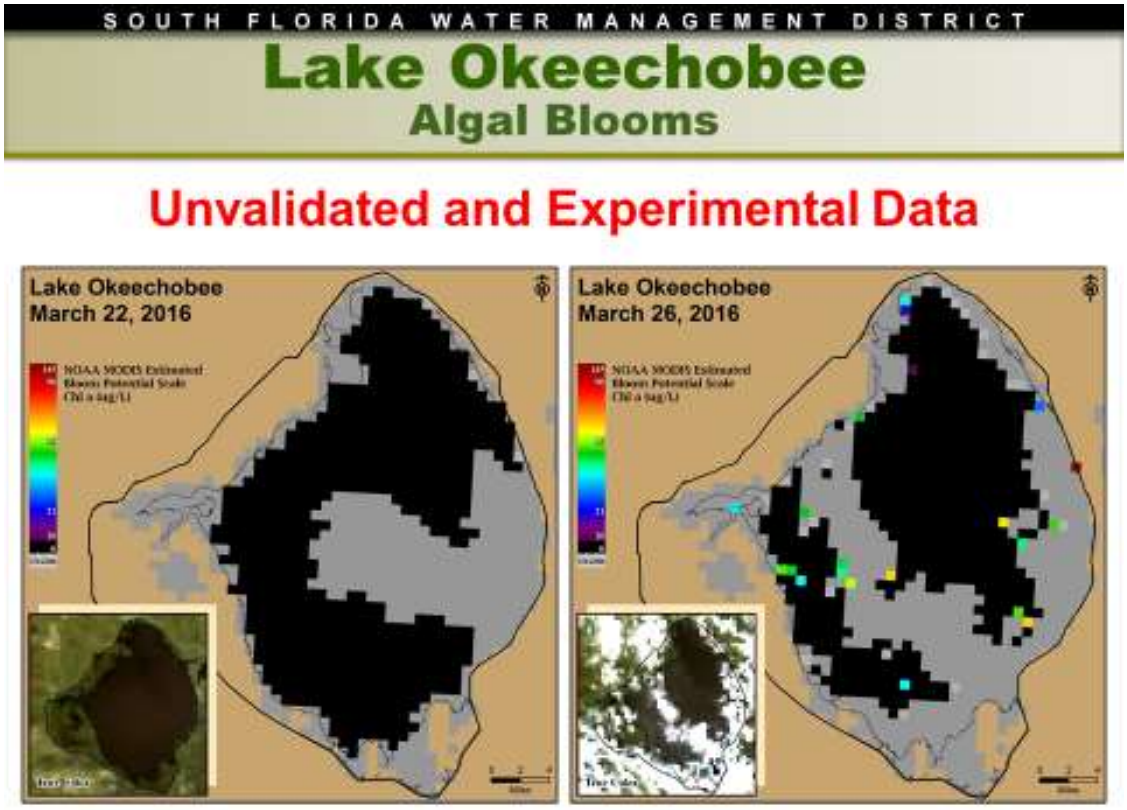


Figure 8

Lake Istokpoga

Lake Istokpoga stage is 39.33 feet NGVD today and is currently 0.17 feet below its regulation schedule of 39.50 feet NGVD, which remains at peak high pool (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks were 299 and 73 cfs respectively, a small increase from the preceding week. Average discharge from S68 and S68X this past week was 177 cfs, a significant decrease compared to the preceding week. According to RAINDAR, 1.34 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

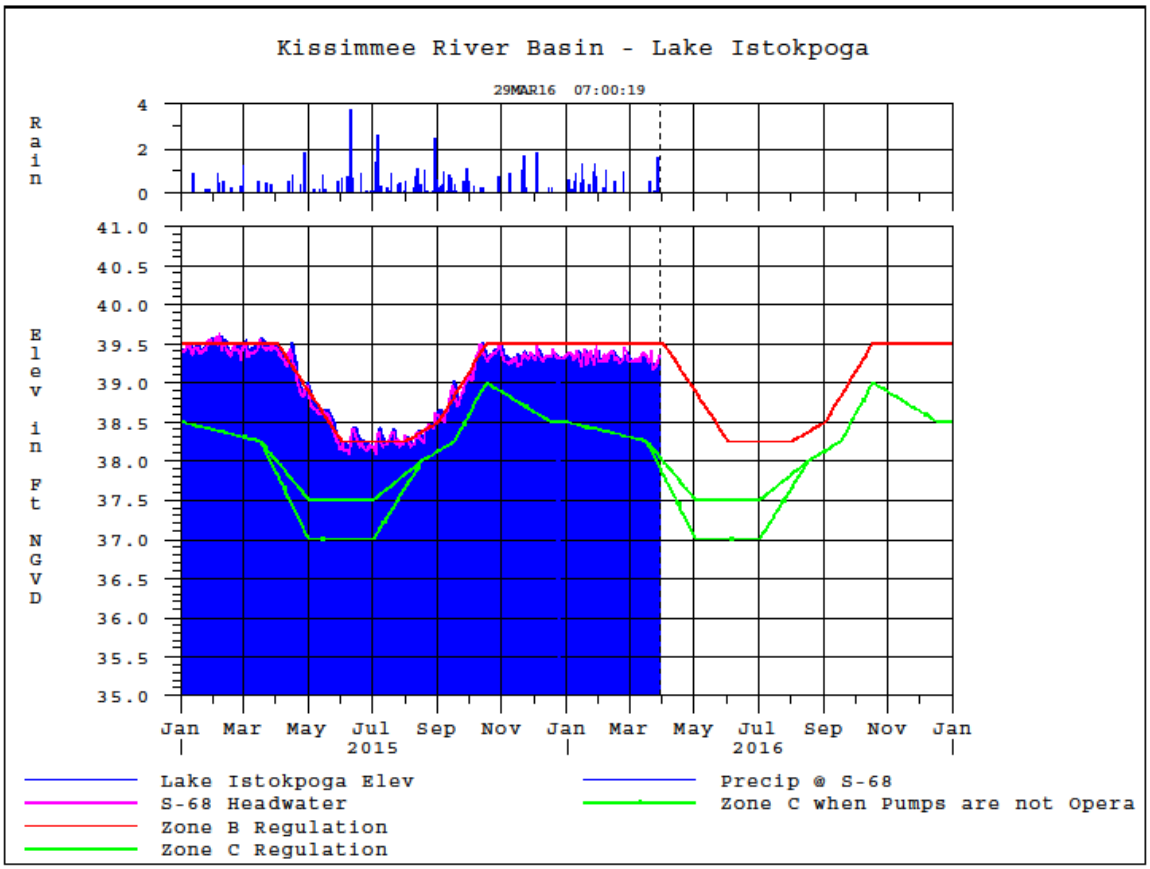


Figure 9

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged 1,184 cfs at S-80, 912 cfs downstream of S-308, 49 cfs at S-49 on C-24, 59 cfs at S-97 on C-23, and 141 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 278 cfs (Figures 1 and 2). Total inflow averaged about 1,711 cfs last week and 2,412 cfs over last month.

Over the past week, salinity increased at HR1 and remained about the same throughout the rest of the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 6.9. Salinity conditions in the middle estuary are in the fair range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	**5.7** (2.7)	**7.2** (6.7)	NA[1]
US1 Bridge	**6.1** (6.1)	**7.8** (10.9)	10.0-26.0
A1A Bridge	**13.8** (13.6)	**24.5** (24.1)	NA

[1]Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 2,273 cfs downstream of S-77, 2,228 cfs at S-78, and 3,039 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 154 cfs (Figures 5 and 6). Total inflow averaged 3,193 cfs last week and 4,409 cfs over last month.

Over the past week, salinity remained about fresh in the upper estuary from S-79 to Ft. Myers Yacht Basin, and increased in the lower estuary from Cape Coral to Sanibel (Table 2, Figures 7 & 8). The seven-day average salinity values are within the poor range for adult oysters at Cape Coral and within the good range at Shell Point and at Sanibel (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass, and are forecasted to remain so in following two weeks even without discharges at S-79 (Figure 10).

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana)* at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
*Val I75	**0.2*** (0.2*)	**0.2*** (0.2*)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	NA
Cape Coral	**3.8** (1.9)	**3.9**[3] (3.1)	10.0-30.0
Shell Point	**19.1** (15.0)	**21.2** (18.3)	10.0-30.0
Sanibel	**27.2** (25.5)	**28.2** (26.6)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average, [3]Three day average
*Val I75 is temporarily offline due to bridge construction.
Salinity values are estimated using models developed for this site.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	**Ft. Myers**	**Shell Point (Feb12-15)**
Chlorophyll *a* (µg/l)	4.1 – 5.3	2.5 – 5.3	2.7 – 6.5
Dissolved Oxygen (mg/l)	5.1 – 7.3	7.1 – 8.9	5.1 – 7.6

The Florida Fish and Wildlife Research Institute reported on March 25, 2016, that *Karenia brevis,* the Florida red tide organism, was observed in background to very low concentrations in two samples collected in and alongshore of Lee County.

<u>Water Management Recommendations</u>

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

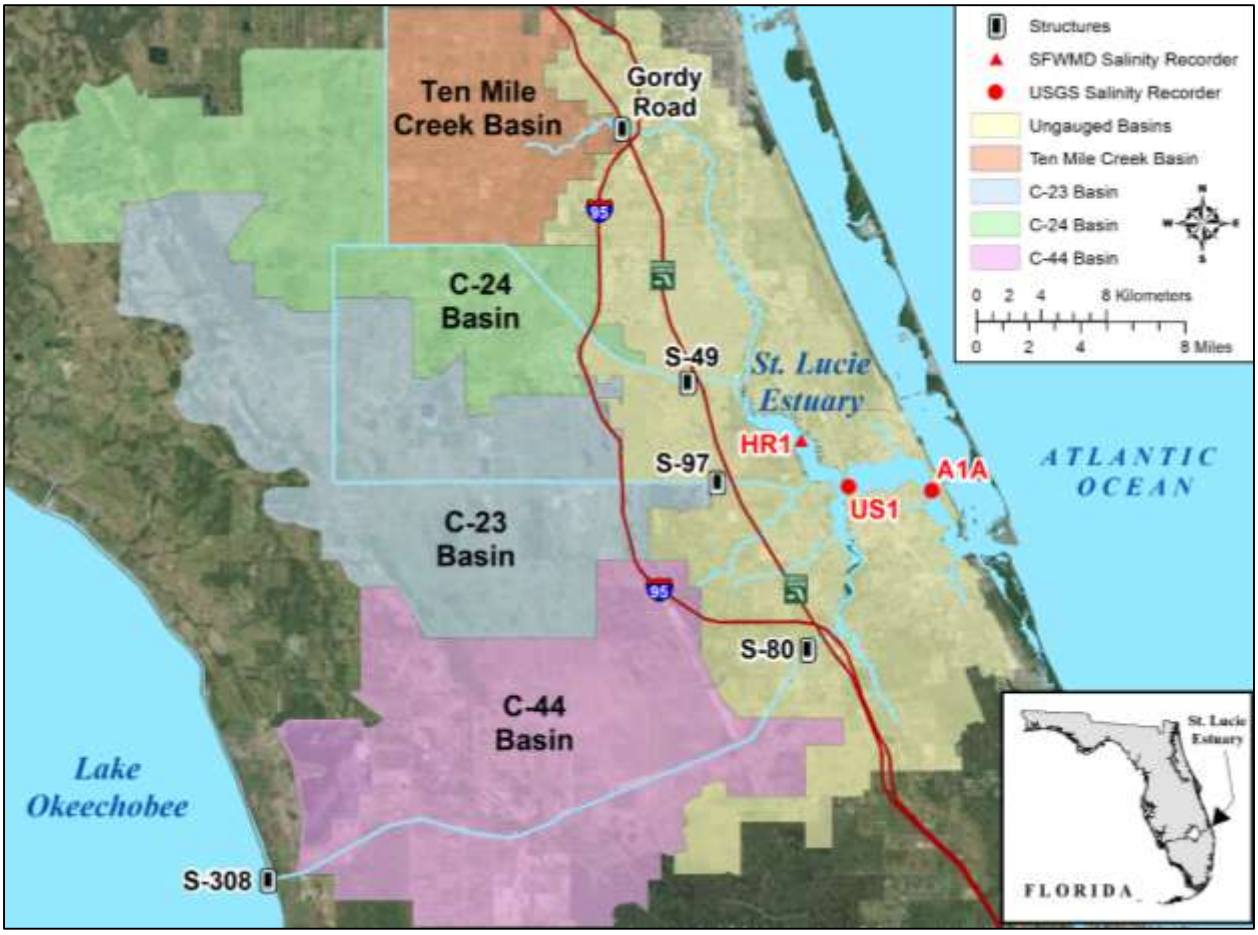


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

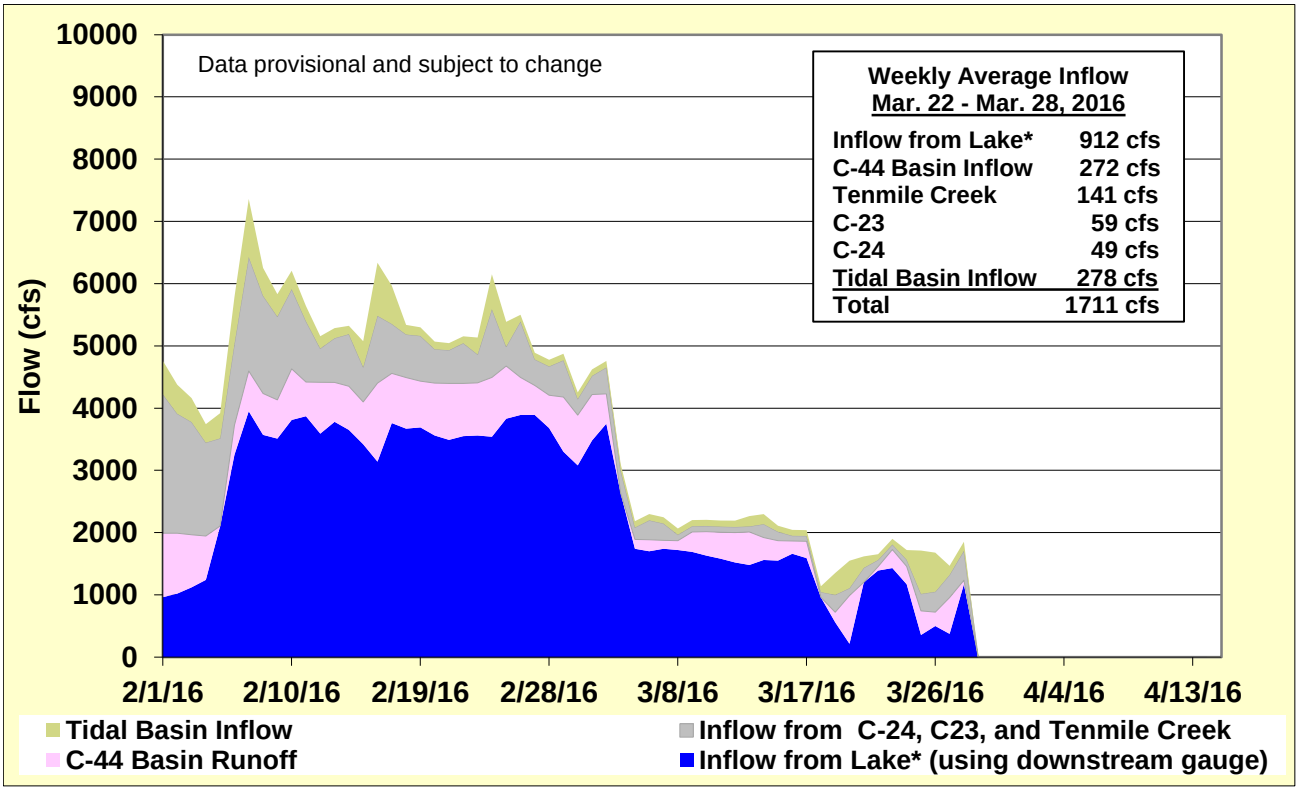


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

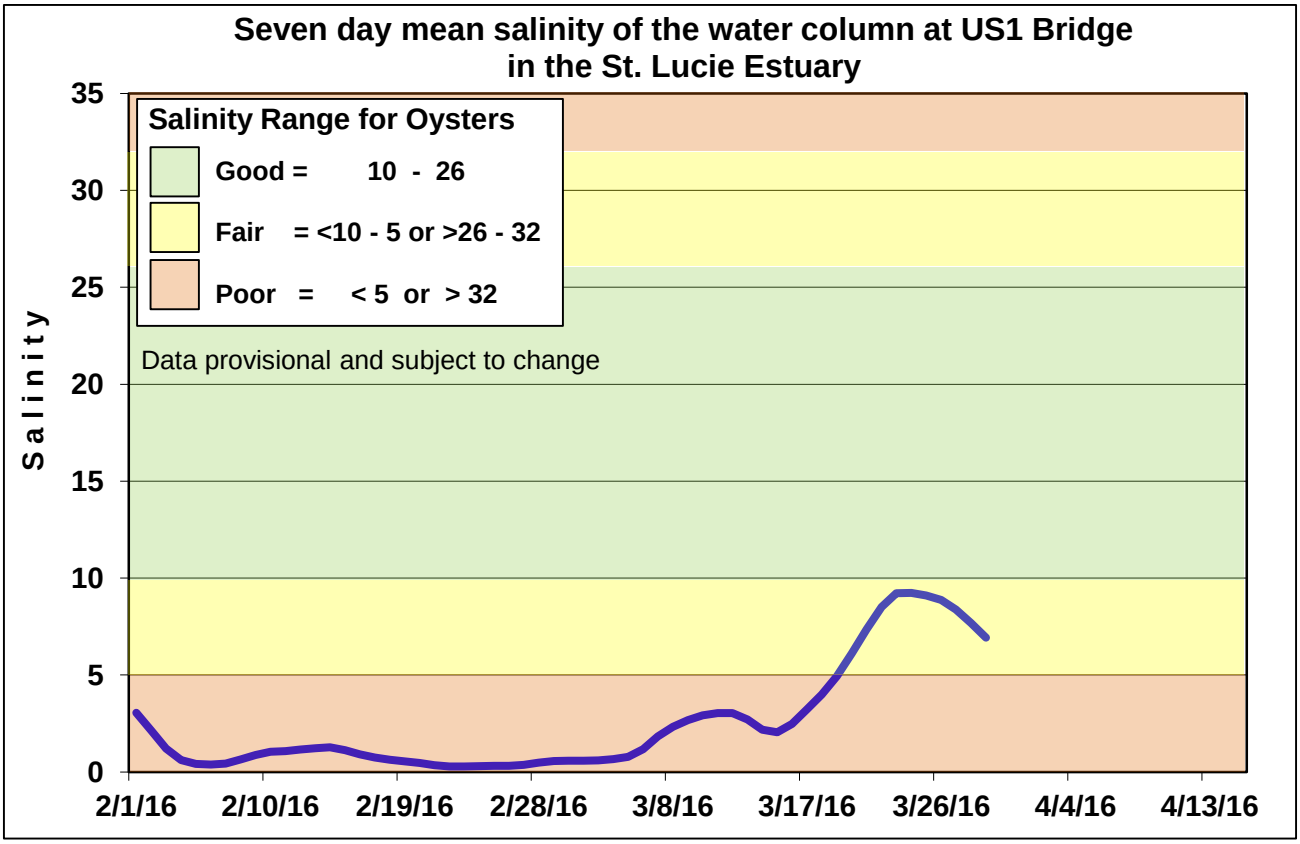


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

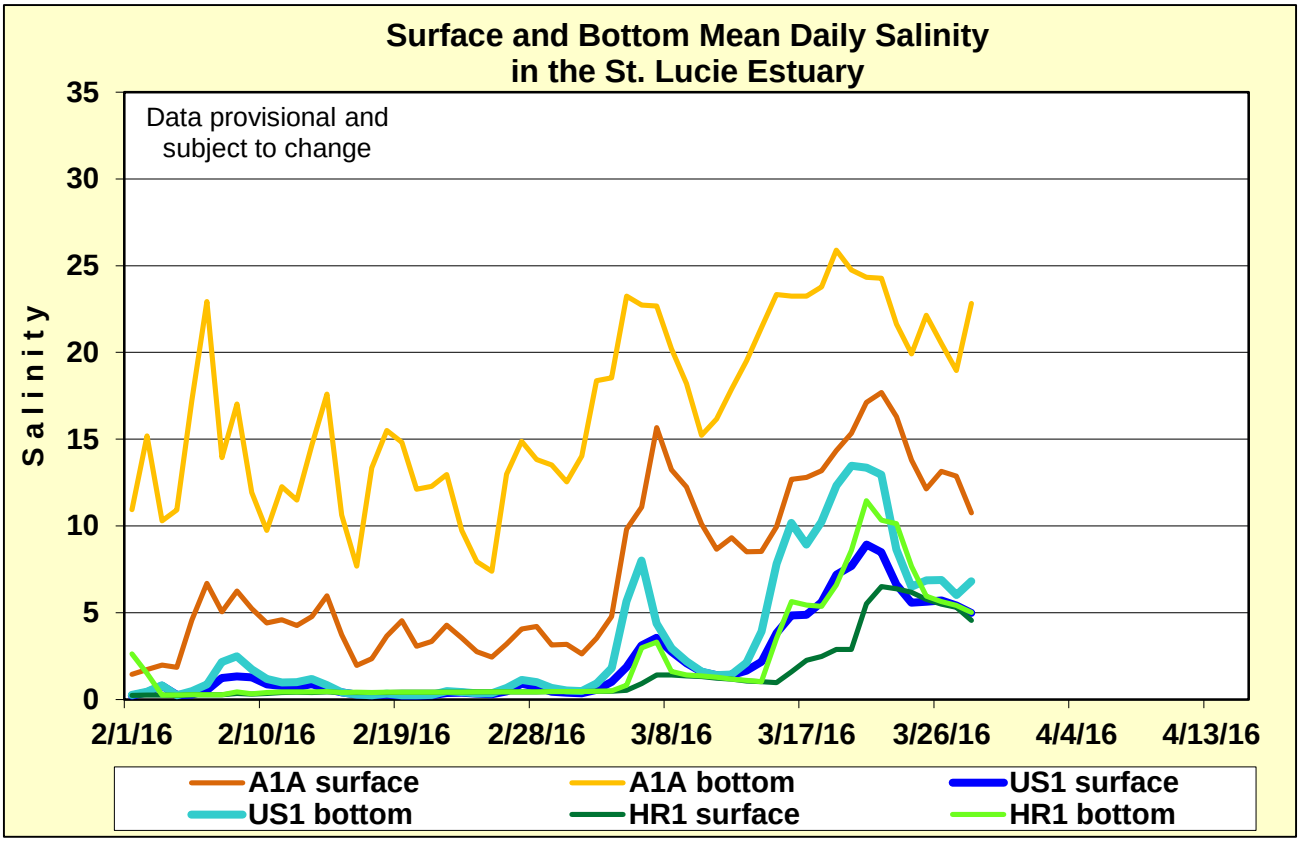


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

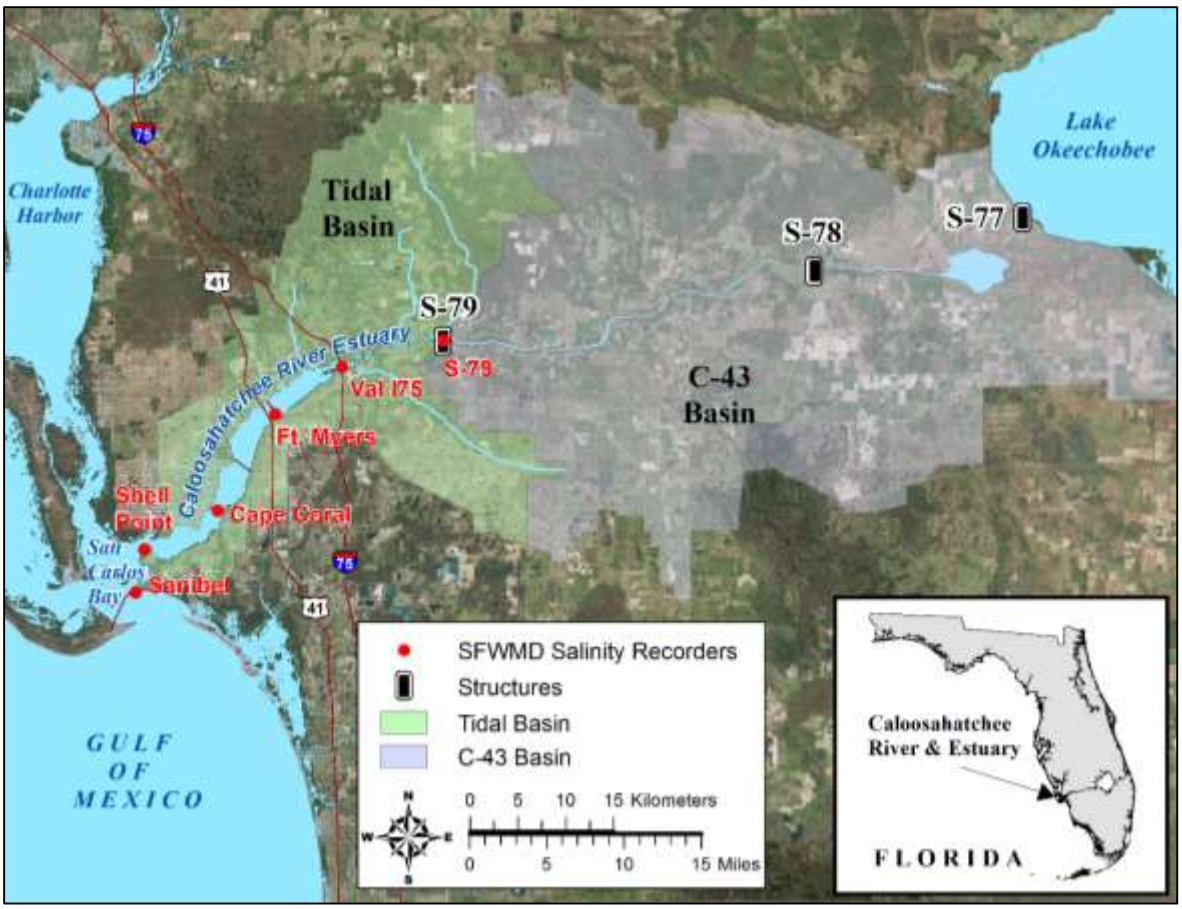


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

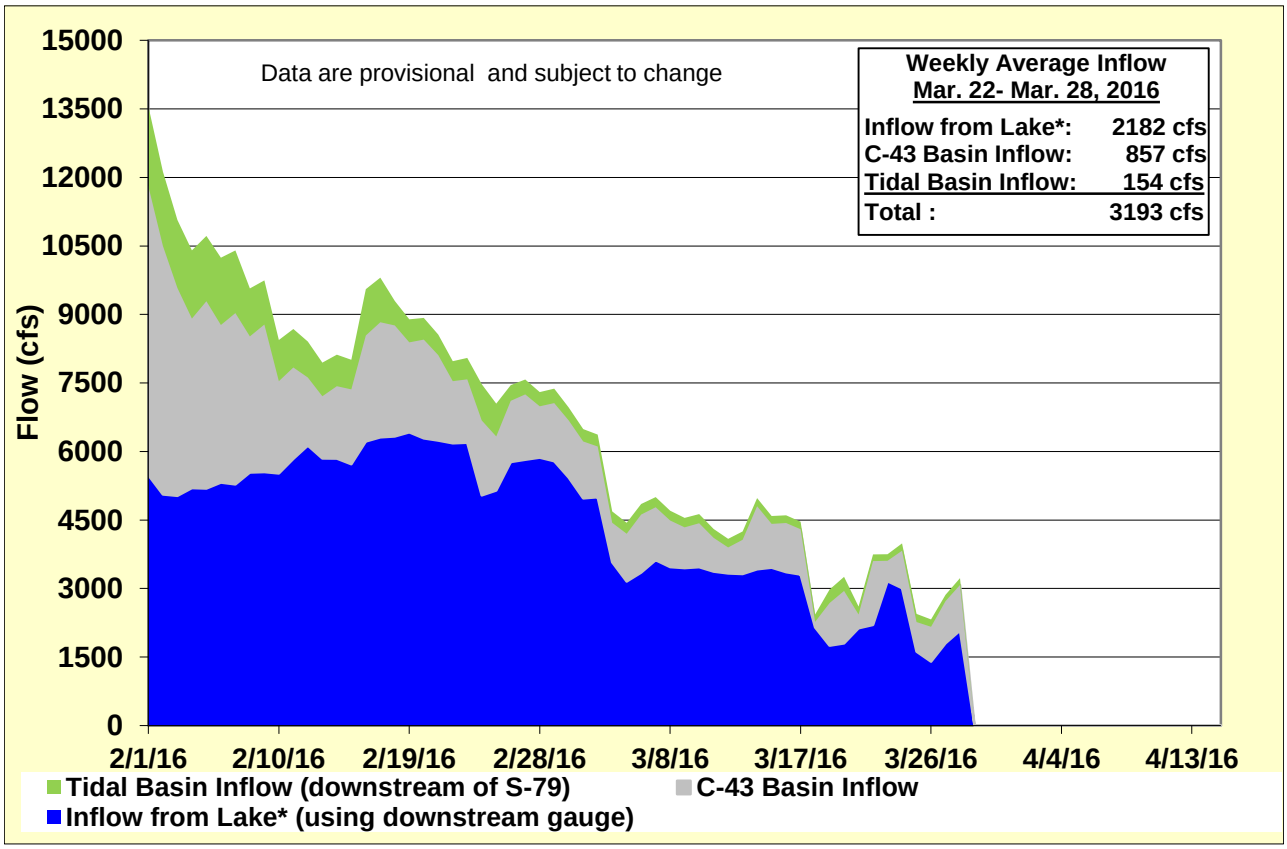


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

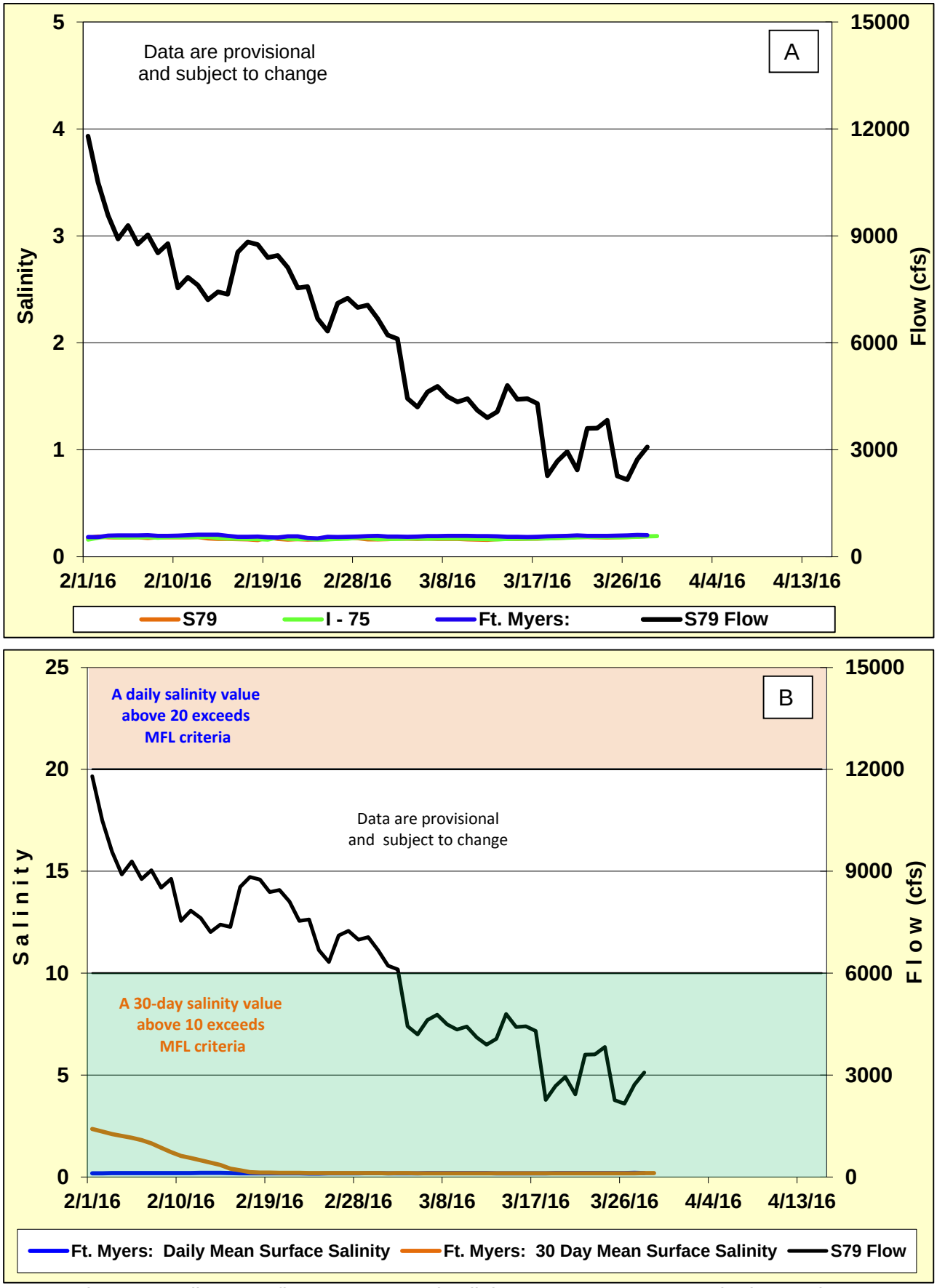


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

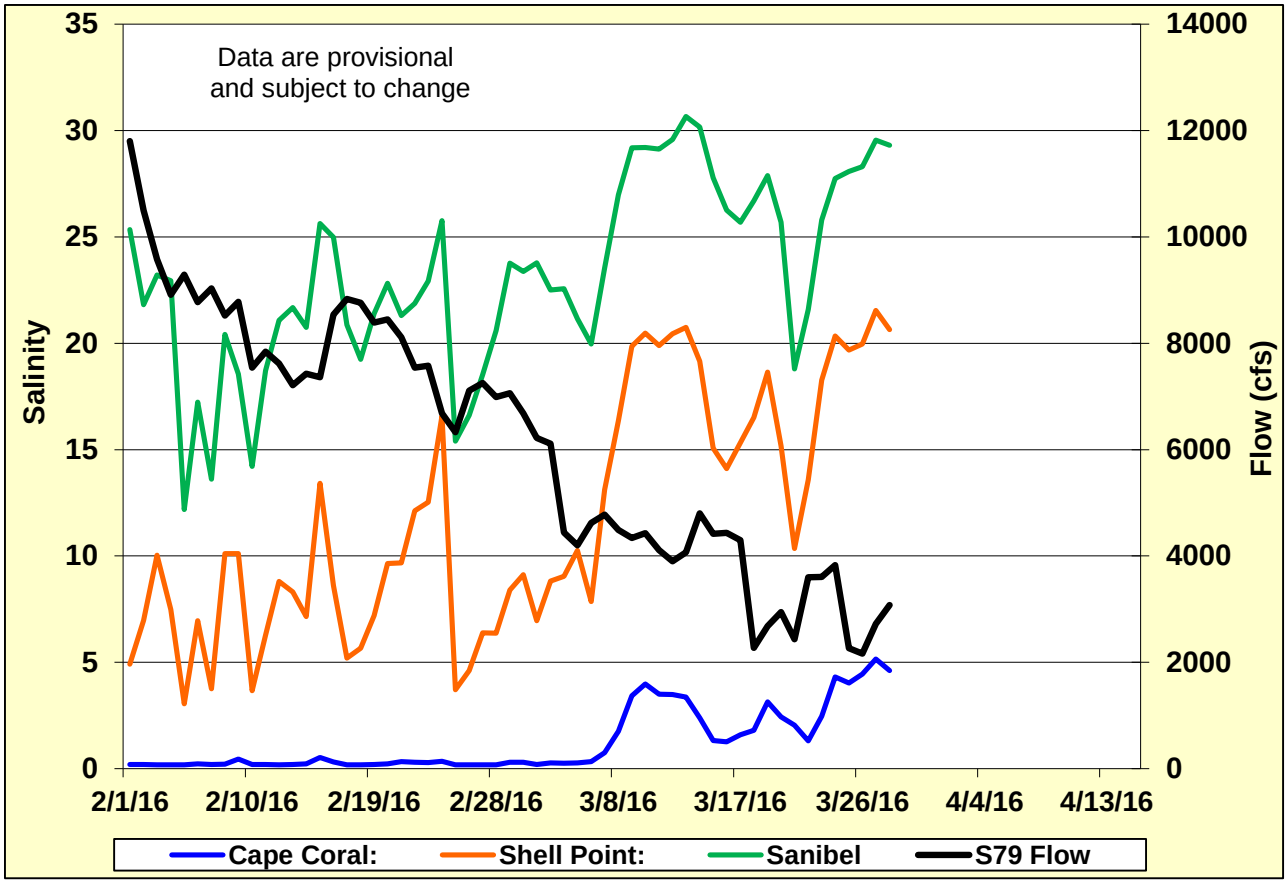


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

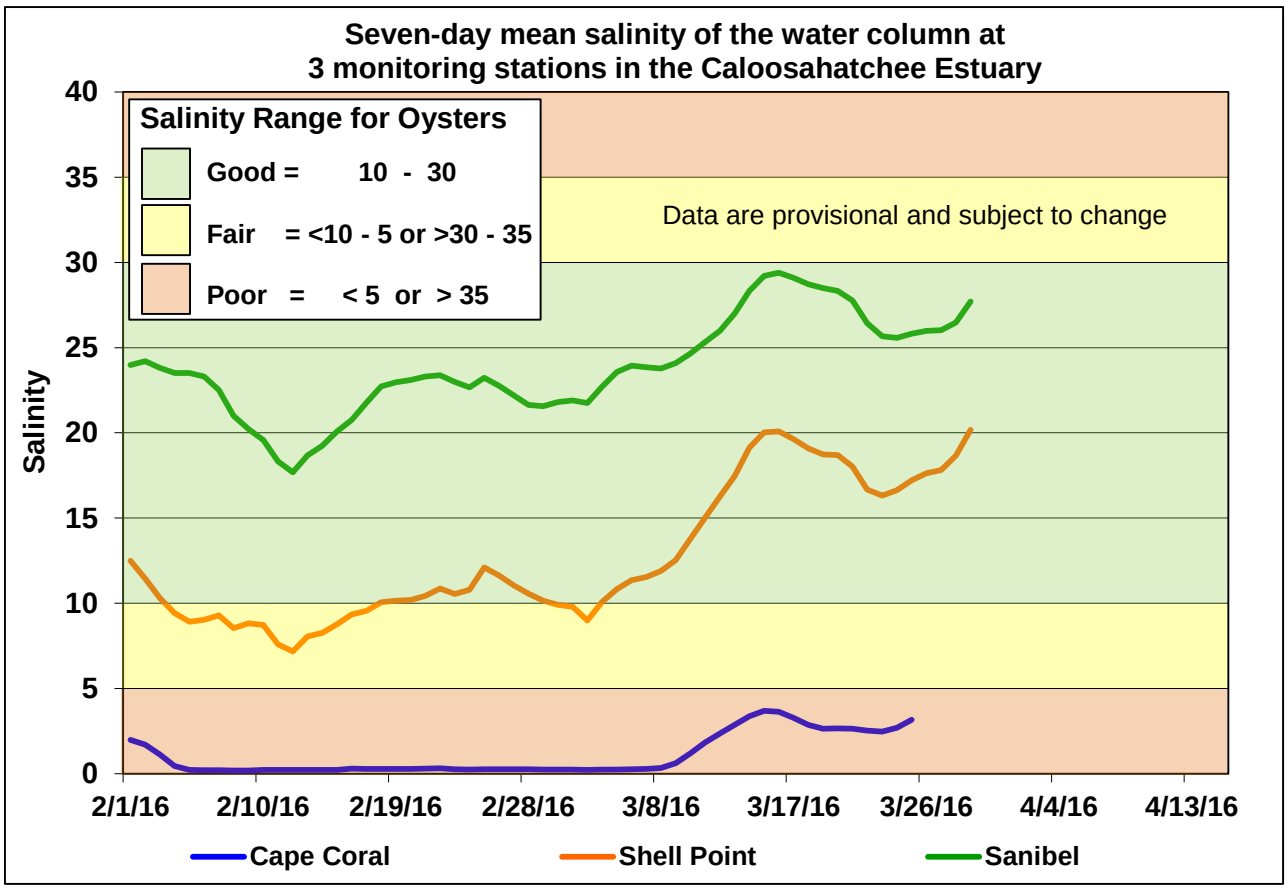


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

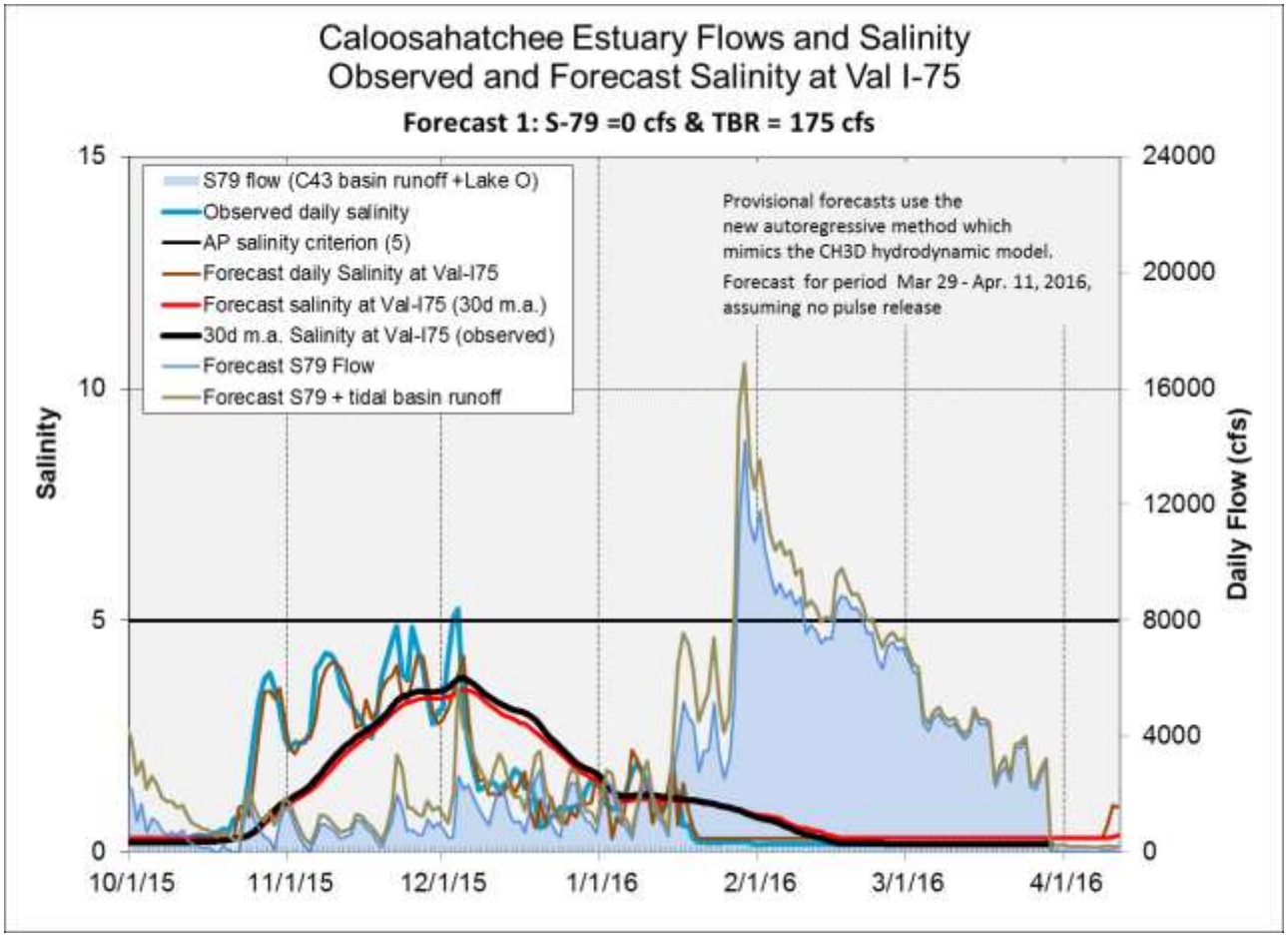


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

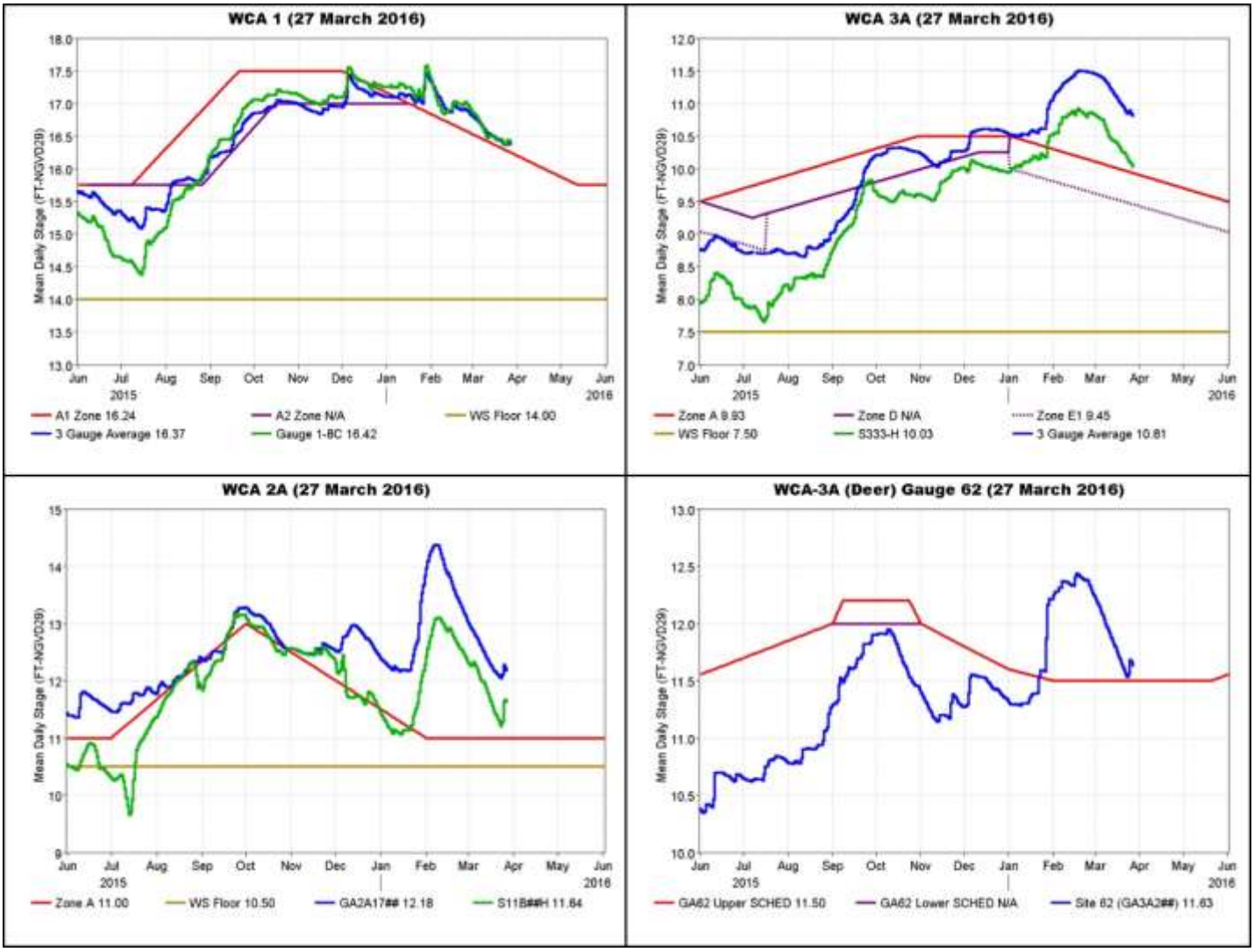
GREATER EVERGLADES

Rainfall was highest this past week in WCA-2A and -2B. Over the week, stages changed in the WCAs −0.18 to 0.04 feet with the increases occurring in WCA-2A and -2B. This week's pan evaporation was 1.33 inches, which is 6% less than the historic average of 1.41 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.38	-0.06
WCA-2A	2.01	0.04
WCA-2B	2.00	0.01
WCA-3A	1.19	-0.12
WCA-3B	0.27	-0.05
ENP	0.29	0.02

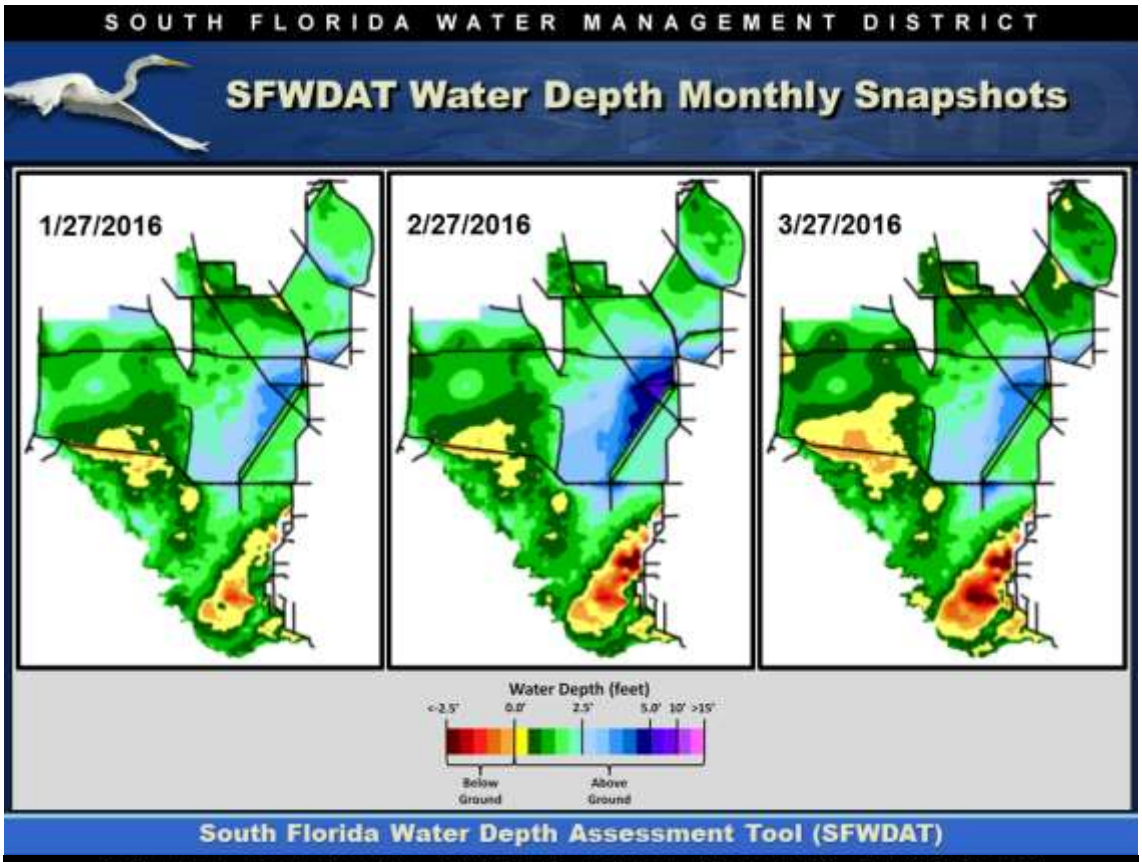
Good
Fair
Poor

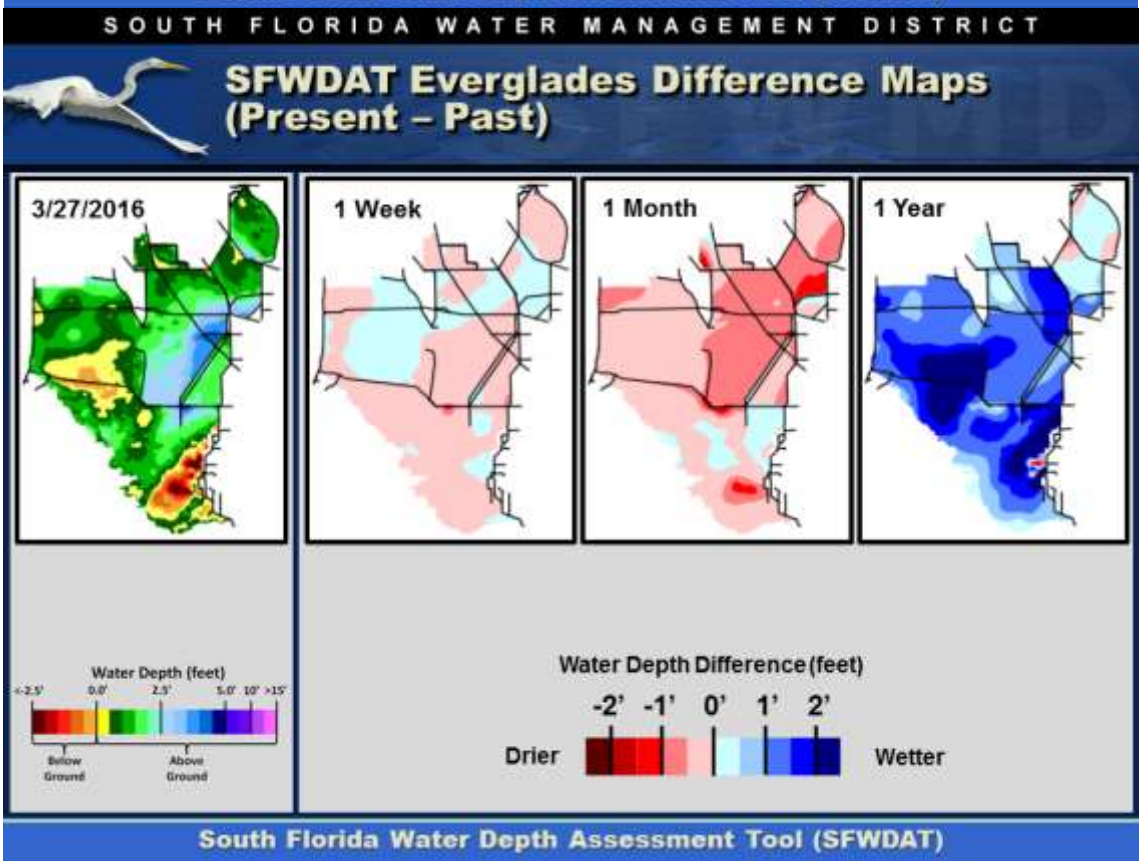
Regulation Schedules: Stages continued to decrease in WCA-1, -3A, and -3B this week but increased in WCA-2A and -2B. The WCA-1 stage difference from regulation increased to 0.13 feet because the regulation line decreased faster than actual stage. The WCA-2A stage is 1.18 feet above regulation, and the three-gauge average stage in WCA-3A is 0.88 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has increased slightly to 0.13 feet above regulation.



Water Depths and Changes: Water levels are mostly decreasing and are generally drier than a month and two months ago. Water depths at the monitored gauges (except WCA-2B) range from 1.08 to 2.95 feet. Depths in southern WCA-3A have exceeded 2.5 feet, the depth of note for tree island inundation-duration, for 18 weeks (it is now 2.95 feet). Gauges 63 and 64 (central and northern WCA-3A) are both less than 2.5 feet.

Stage changes tracked rainfall patterns. Stages increased last week in WCA-2A and -2B, northcentral WCA-3A, and Big Cypress Preserve. Stages at individual gauges changed −0.18 to +0.04 feet in the WCAs and northern Shark River Slough. Relative to a year ago, stages are still generally higher.

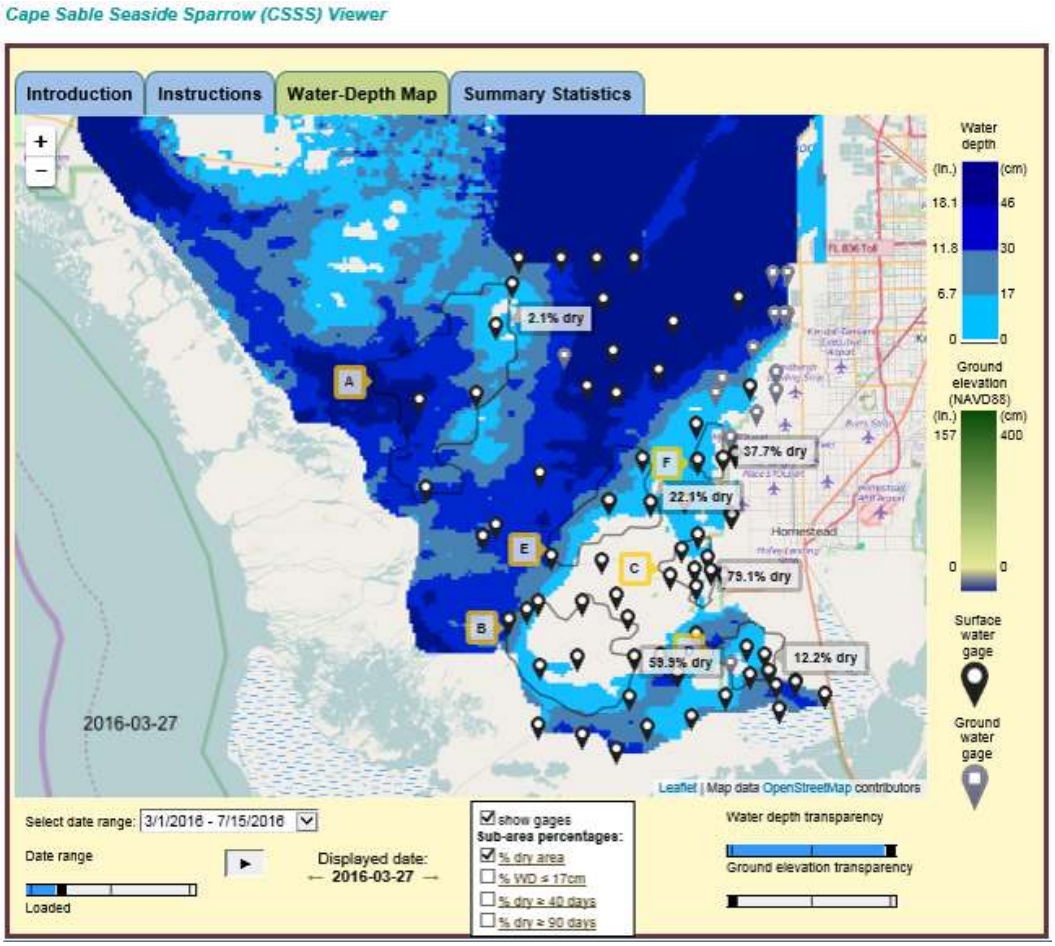




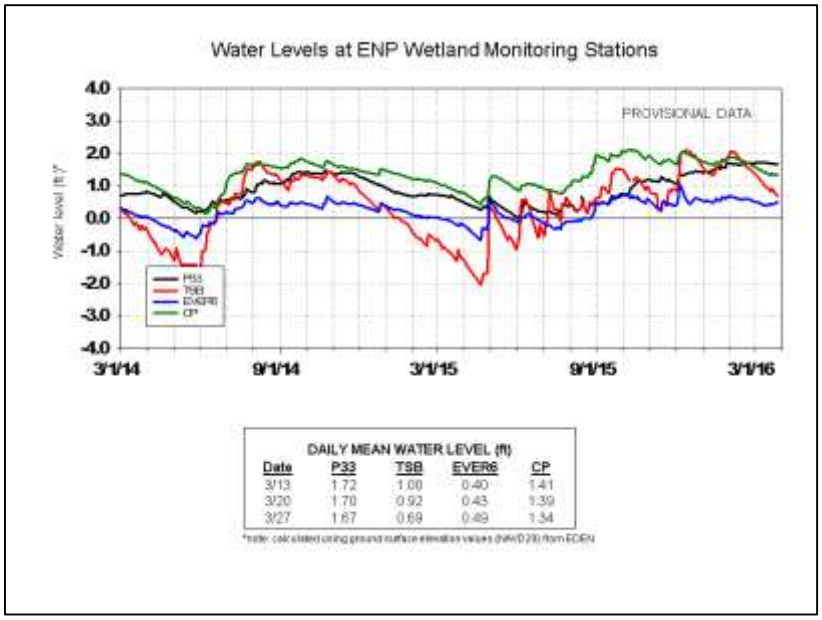
Wading birds and wildlife: Current conditions are poor for most wading bird nesting, but are potentially improving for white ibis. There are eight active Snail Kite nests in the extreme south and western half of WCA3A. There are five active Snail Kite nests in WCA-3B along the remnant agricultural

ditches. There are also three nests in Everglades National Park near the Blue Chanty/Eastern Shark River Slough. Loxahatchee National Wildlife Refuge has two nests along its eastern boundary.

Cape Sable Seaside Sparrow: All populations are seeing lower water levels and increased percentages of dry area compared to last week. Since conditions have been poor for early season breeding, improved conditions later in the season (May-June) may provide late season breeding opportunities.

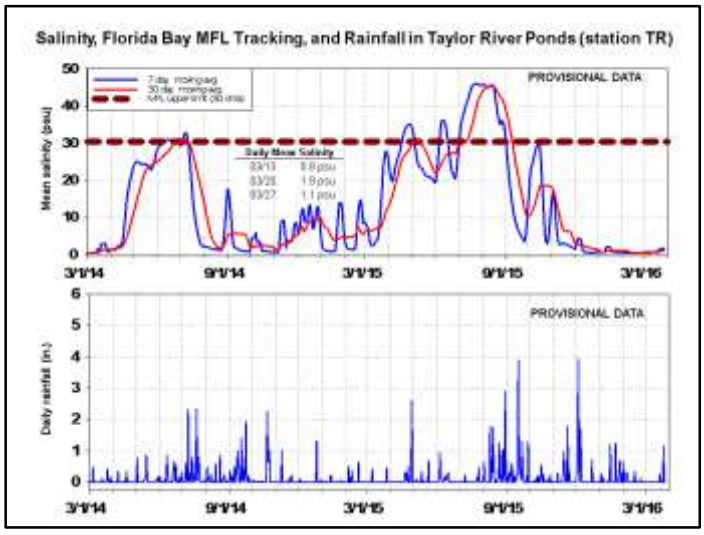


Everglades National Park (ENP) and Florida Bay: Water levels continued to decrease this past week in Taylor Slough while increasing slightly in the ENP panhandle. Northern Taylor Slough is 13 inches above average (two inches less than last week), and southern Taylor Slough and the ENP panhandle are six to nine inches above average. Average water levels are decreasing at this time of year, so unless the current levels decrease faster the area will continue to be above average.



Salinities in Florida Bay decreased slightly and are −1 to −7 psu below average. After the heavy rains, the central and western areas of the bay are −1 to −4 psu below average with salinities that range from 25 to 36 psu. The eastern bay areas are −4 to −7 psu below their long-term averages with salinities that range from 17 to 25 psu. Upstream in the mangrove ecotone, the daily average salinity at the MFL sentinel site of TR decreased from 1.9 psu to 1.1 psu, which is below the seasonal average of 11 psu. The seasonal averages of all stations will be rising from now through June. The 30-day moving average salinity at TR rose to 1.0 while the typical 30-day moving average salinity for this time of year is about 10 psu and rising.

The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay rose to 263,750 acre-feet this week, which is about 8,000 acre-feet higher than last week and is now higher than the average 365-day running sum for the five creek flow over the period of WY1997-2014 which is 257,628 acre-feet (this number is not seasonal). The weekly (March 21 – 27) cumulative flow from the five creeks was 7,132 acre-feet as a result of recent rainfall and water deliveries. Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- The average stage at gauges 62 and 63 in WCA-3A has fallen below 11.60 feet (currently 11.38 feet), but reversals should continue to be avoided.

- Water levels at gauge 65 have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 18 weeks (now 2.95 feet deep). Both gauge 63 and 64 are now below 2.5 feet.

- Conditions are too wet, too deep, and too variable for wading birds. As conditions improve, recession rates through the end of May should be managed to support foraging.

- Additional water should not be released into WCA-3A, where most of the remaining tree islands are located, because of harm to tree islands, terrestrial wildlife, and wading bird foraging and nesting.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, March 29, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed −0.05' to −0.07'	Rainfall, ET, management	Match inflows with outflows to achieve regulation schedule recession while allowing water levels to reflect variation in annual rainfall. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting.
WCA-2A	Stage increased 0.04'	Rainfall, ET, management	Lower stages. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
WCA-2B	Stages increased 0 to 0.03'	Rainfall, ET, management	Follow normal seasonal practices.	High stages generally preclude wading bird use, but can provide good habitat for wading bird foraging as stages decline at the end of the dry season.
WCA-3A NE	Stage decreased −0.08'	Rainfall, ET, management	**WCA-2A and northern WCA-3A inflow are not recommended at this time because of high water and ecological concerns. Lower stages throughout the WCAs would be ecologically beneficial.**	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting. Northern WCA-3A and WCA-2A have been closed to the public because of high water effects on wildlife. Additional inputs into these areas are not recommended until stages decline below 11.60' average of gauges 62 and 63.
WCA-3A NW	No change	Rainfall, ET, management		
Central WCA-3A S	Stage decreased −0.18'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Lower the stages. Stages at gauge 65 have exceeded 2.5' since Nov. 23 (18 weeks, now 2.95'), and gauges 63 and 64 are now both below 2.5'.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
Southern WCA-3A S	Stage changed −0.21'	Rainfall, ET, management		
WCA-3B	Stages decreased −0.03' to −0.07'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
ENP-SRS	Stage increased 0.02'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B are closed to enhance dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTP closures for S12-A and B. Maximizing flows through S333, as possible, is recommended. Follow guidance in C-111 western spreader canal project operations manual.	Provide appropriate hydrological and habitat conditions for CSSS.
Taylor Slough	6-13 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	−1 to −7 psu below average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.